the OIL AND GAS JOURNAL

TECHNOLOGICAL
APR 29
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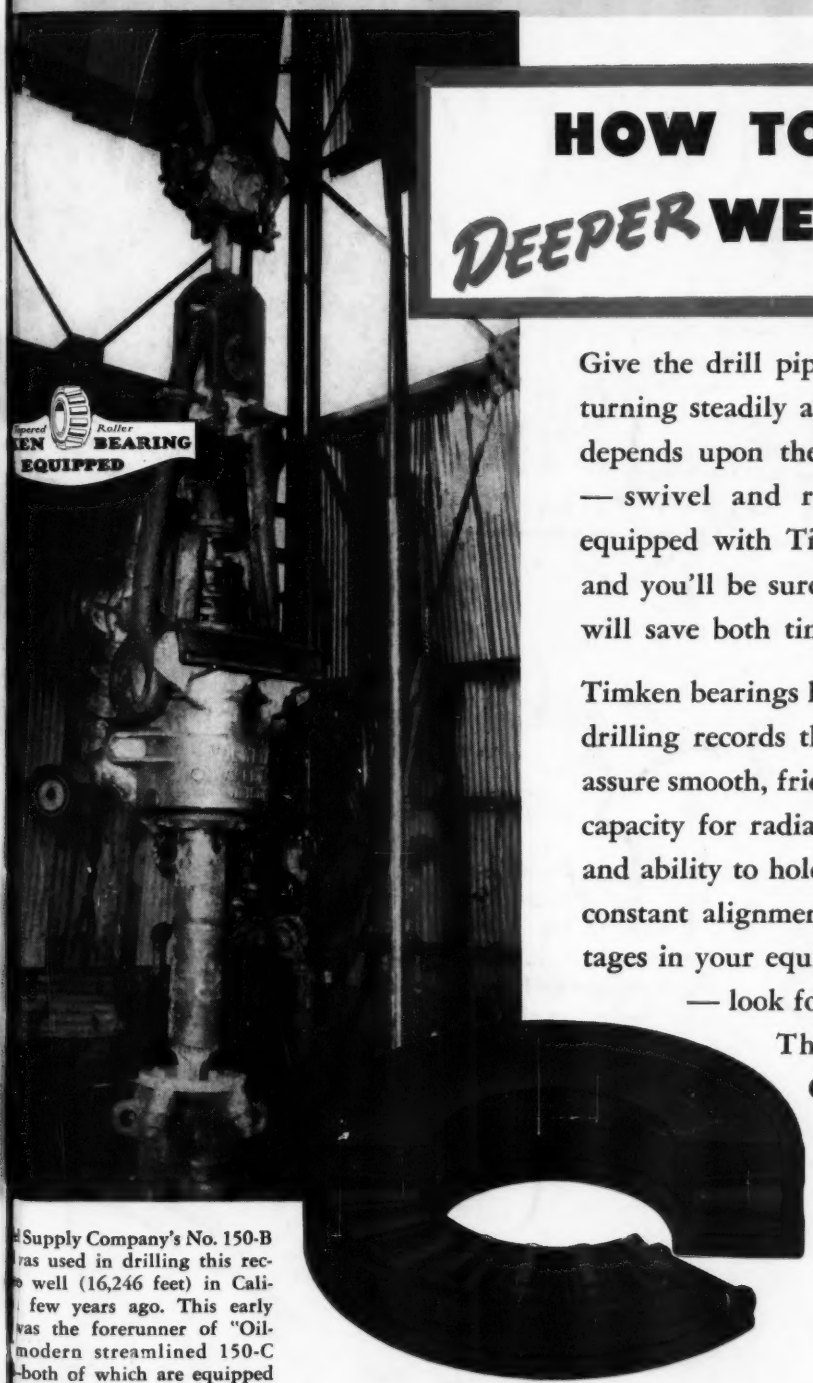


Supply Company's No. 150-B
was used in drilling this rec-
o well (16,246 feet) in Cali-
few years ago. This early
was the forerunner of "Oil-
modern streamlined 150-C
both of which are equipped
imken bearings.

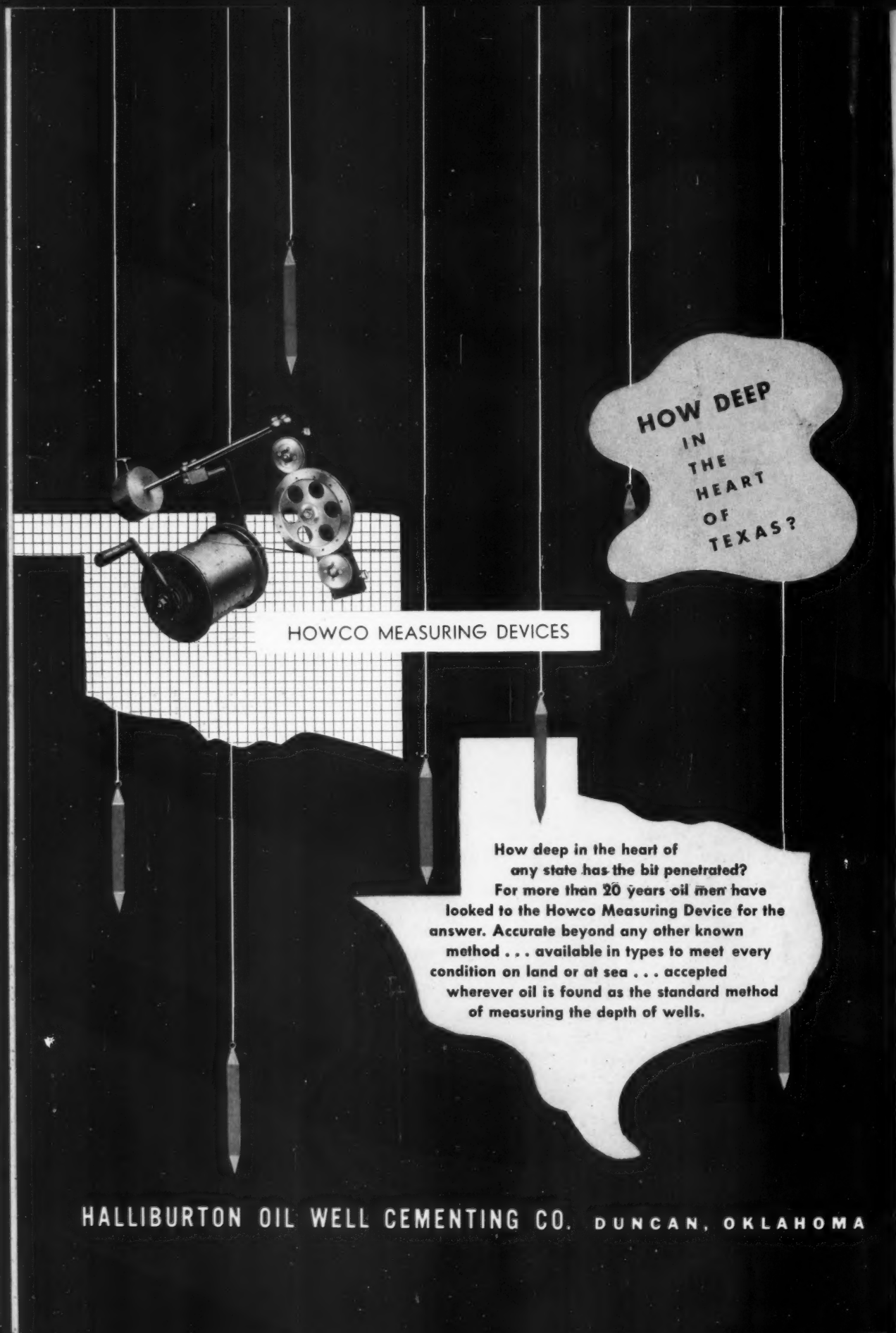
HOW TO DRILL
DEEPER WELLS FASTER

Give the drill pipe proper support and keep it turning steadily at maximum speed. Doing this depends upon the mechanical factors involved — swivel and rotary. Make sure they are equipped with Timken tapered roller bearings and you'll be sure of drilling performance that will save both time and cost.

Timken bearings have participated in more deep drilling records than any other bearings. They assure smooth, friction-free operation; maximum capacity for radial, thrust and combined loads; and ability to hold rotating parts in correct and constant alignment. You need all these advantages in your equipment. See that you get them — look for the trade-mark "TIMKEN".

The Timken Roller Bearing Company, Canton 6, Ohio. Cable address "TIMROSCO".

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS


HOW DEEP
IN
THE
HEART
OF
TEXAS?
HOWCO MEASURING DEVICES
How deep in the heart of
any state has the bit penetrated?
For more than 20 years oil men have
looked to the Howco Measuring Device for the
answer. Accurate beyond any other known
method . . . available in types to meet every
condition on land or at sea . . . accepted
wherever oil is found as the standard method
of measuring the depth of wells.
HALLIBURTON OIL WELL CEMENTING CO. DUNCAN, OKLAHOMA

Stays on the Job at elevated Temperatures

Want a stud you can count on for economical service? . . . One that stays on the job for long periods of time, even at elevated temperatures? The Bethlehem continuous-thread stud is your answer.

The continuous-thread stud is ideal for high-temperature bolting applications because it minimizes stress concentrations. There being no point of thread runout, the fatigue or vibration stresses so often encountered in refinery bolting are distributed over the full length of the stud.

Bethlehem continuous-thread studs are precision-made from carbon or alloy steel, and are furnished either plain or heat-treated. They come in a complete range of diameters and in any length, with most sizes carried in stock.

Complete details about the continuous-thread stud are available for the asking. Why not put your questions up to the nearest Bethlehem sales office. Or drop a line to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

Continuous-thread studs are a product of Bethlehem's Lebanon, Pa., Plant

Bethlehem supplies every type of Fastening

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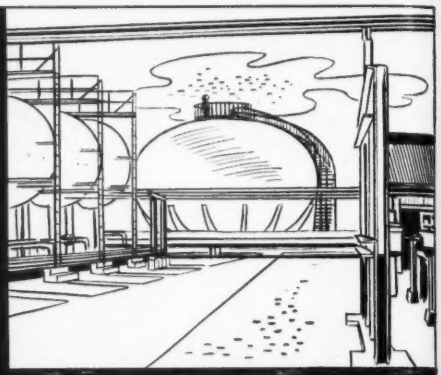
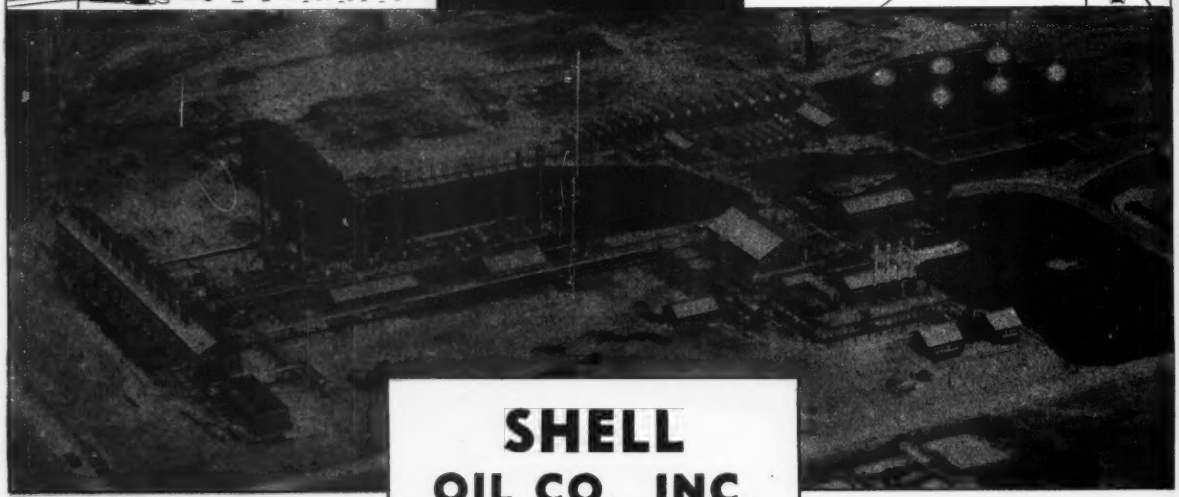
STORY OF A JOB





SHELL OIL CO., INC.
TXL GASOLINE PLANT
NOTREES, TEXAS

The best laid plans of men are frequently subjected to change by various influencing circumstances. Such was the case at Shell Oil Company's TXL Gasoline Plant near Odessa, Texas. Brown & Root, Inc., was awarded the contract to build a 30,000 mcf gasoline plant for Shell. During construction, new field development made it necessary to increase the throughput to 45,000 mcf. Shortly after completion, still further demands necessitated tripling the original capacity to handle 90,000 mcf!

We believe flexibility to meet changing conditions is the prime asset of any contractor. Brown & Root, Inc., will do ALL of your engineering and construction or will work closely with your own technical personnel to fit your needs.

BROWN-BILT

BROWN & ROOT, Inc. *Engineers ▲ Constructors*

P. O. BOX 3, HOUSTON 1, TEXAS

CABLE ADDRESS — BROWNBILT

Associate Companies:— BROWN ENGINEERING CORP. • BROWN & ROOT MARINE OPERATORS INC.

AVOID THE LUXURY TAX

on Idle Horsepower

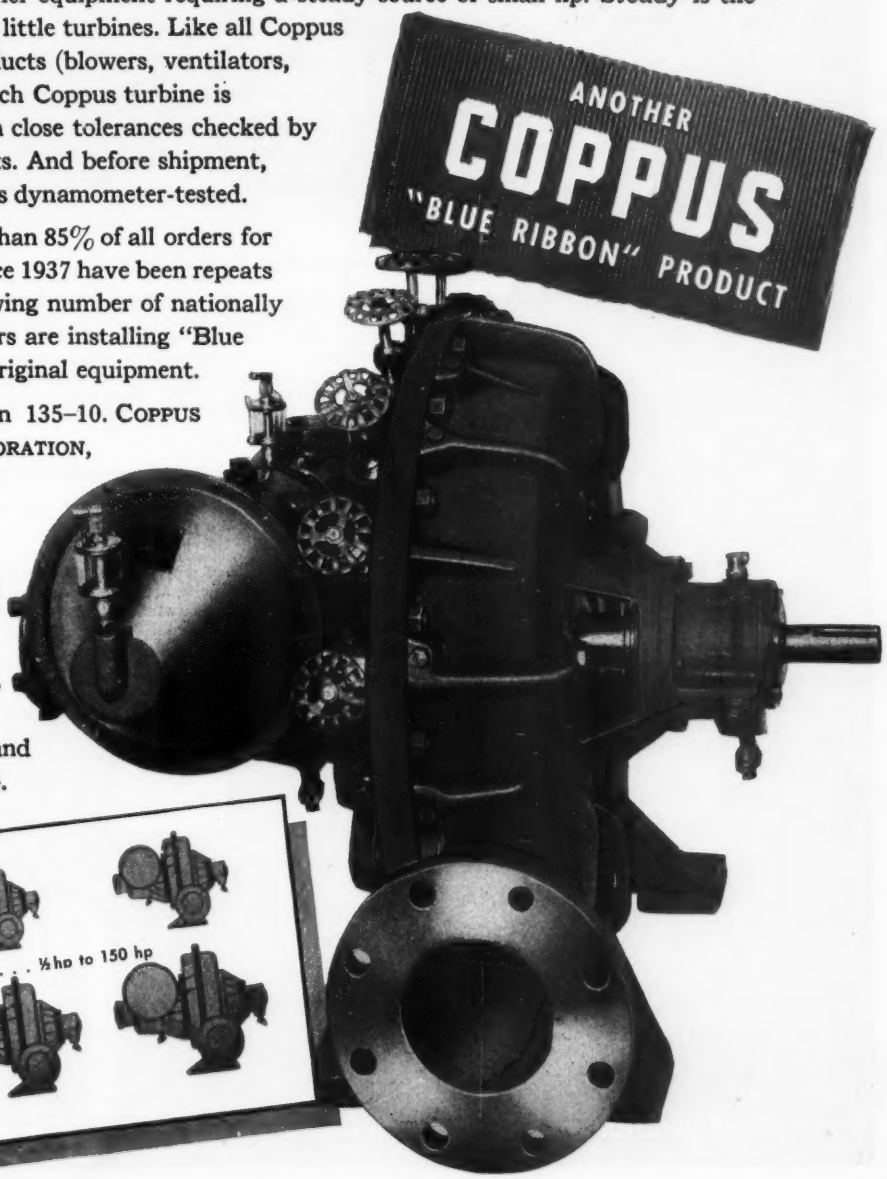
When your horsepower needs are small, why pay the extra cost of larger turbines, designed for much more power than you require?

You pay only for the horsepower you need when you fit the right Coppus "Blue Ribbon" Turbine to the load. They're made in six frame sizes . . . from 150 hp down to fractional . . . priced in proportion to their size.

That's why you'll see more and more Coppus turbines powering pumps, blowers, fans, stokers and other equipment requiring a steady source of small hp. *Steady* is the word for these busy little turbines. Like all Coppus "Blue Ribbon" products (blowers, ventilators, gas burners, etc.) each Coppus turbine is precision-made, with close tolerances checked by Johansson size blocks. And before shipment, the turbine you get is dynamometer-tested.

No wonder more than 85% of all orders for Coppus turbines since 1937 have been repeats . . . and that a growing number of nationally known manufacturers are installing "Blue Ribbons" on their original equipment.

Write for Bulletin 135–10. COPPUS ENGINEERING CORPORATION, 265 Park Avenue, Worcester 2, Mass. Sales Offices in THOMAS' REGISTER. Other products in BEST'S SAFETY DIRECTORY, CHEMICAL ENGINEERING CATALOG and REFINERY CATALOG.



DRILL CUTTINGS ANALYSIS

reservoir road markers

If it's worth drilling, it's worth logging.

With the techniques and facilities for accurate Drill Cuttings Analysis available in every active drilling area, no exploratory effort can reasonably justify the inefficiency of "high balling" from grass roots to total depth and coring *only* those formations which were earmarked geologically when the location was staked. Likewise, the procedure of coring through *all* probable productive zones is equally as uneconomical.

By logging each foot drilled, Core Lab's service of Drill Cuttings Analysis eliminates *productive impossibilities;* marks *stray pays* worthy of consideration for coring; and pin-points *anticipated productive horizons.*

The same Core Lab crew working from the same portable unit then follows through with accurate Core Analysis of each foot of analyzable core recovered — *a practical package of service combined with experience to coordinate your drilling, coring, and core analysis program.*

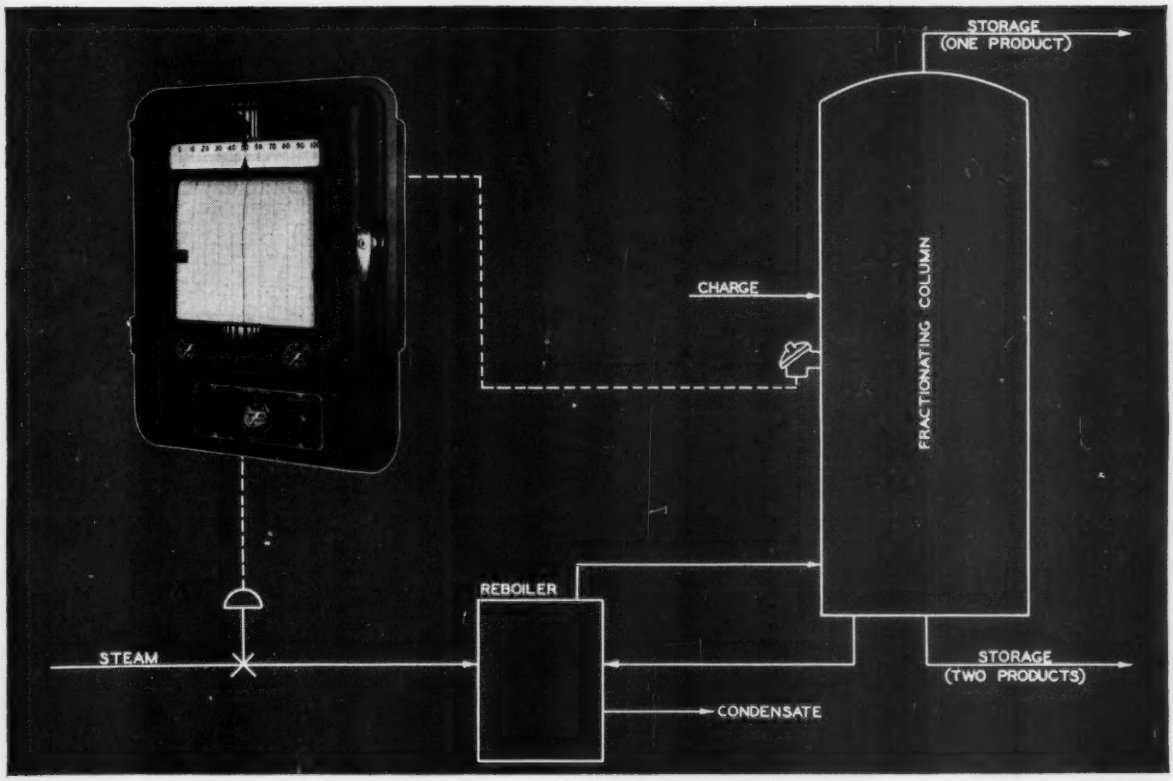
CORE LABORATORIES, INC. • DALLAS, TEXAS

DALLAS HOUSTON CORPUS CHRISTI SHREVEPORT TYLER LAFAYETTE NATCHEZ
OKLAHOMA CITY DENVER MIDLAND ABILENE SANGELY WORLAND BAKERSFIELD

"If it's worth drilling, it's worth logging."

CORE LAB

PETROLEUM RESERVOIR ENGINEERING



This Tower's Costly Cycling Stopped By Speedomax Control

An L&N Field Engineer seated himself in the office of the Process Engineer of a large chemical plant. "How'd that new Speedomax Controller work out?" he asked. "Last time I was here you were installing it to handle that mid-tower control point, separating one component out of three in the tower charge."

The Process Engineer nodded. The Controller, he said, had worked out well. Other controllers had not been successful for that fractionation, because none had been able to overcome an upset without considerable cycling. And cycling, when it happened, could cost as much as a hundred dollars a minute for lost production. So ——

"Pardon me," the L&N man interrupted, "Did you say a hundred dollars a *minute*?"

Yes, the Process Engineer said, cycling could cost one hundred bucks every 60 seconds — and could last for a quarter of an hour, in bad upsets. So, he had been interested in this new L&N control, and didn't lose much time in putting one on that tower.

Then he had run a little test, just to prove what he was getting in the way of superior control. He had thrown an upset into the tower, and watched how long it took Speedomax to bring the temperature back into line. Then he switched to the older controller, and threw in the same upset. It took the other instrument just three times as long as Speedomax — and, at that hundred dollars a minute, he felt that Speedomax was paying for itself mighty fast!

This control problem was not, technically, particularly tough; it got the spotlight because of the great value of the chemical being processed. But, whether an occasional cycling costs your plant a hundred dollars or only a dollar a minute, we thing an examination of the possibilities of L&N Control would be worth your while. We will be glad to talk it over, or will send our new Catalog ND4B if you prefer. Write Leeds & Northrup Company, 4959 Stenton Ave., Philadelphia 44, Pa.

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

LEEDS & NORTHRUP CO.

Jrl Ad ND46-33-702(1)

We have coated and wrapped more than 200 million feet of pipe, sizes ½" to 60" both inside and outside (and that's a lot of pipe in anybody's language). Ninety-six (96) of the top hands in the business.

By the addition of more and better equipment, we are ABLE, WILLING AND READY to handle both your new and used pipe jobs. Complete reconditioning services available.

"PUTTING *Permanence* IN PIPE"

MAYES BROS. INCORPORATED HOUSTON

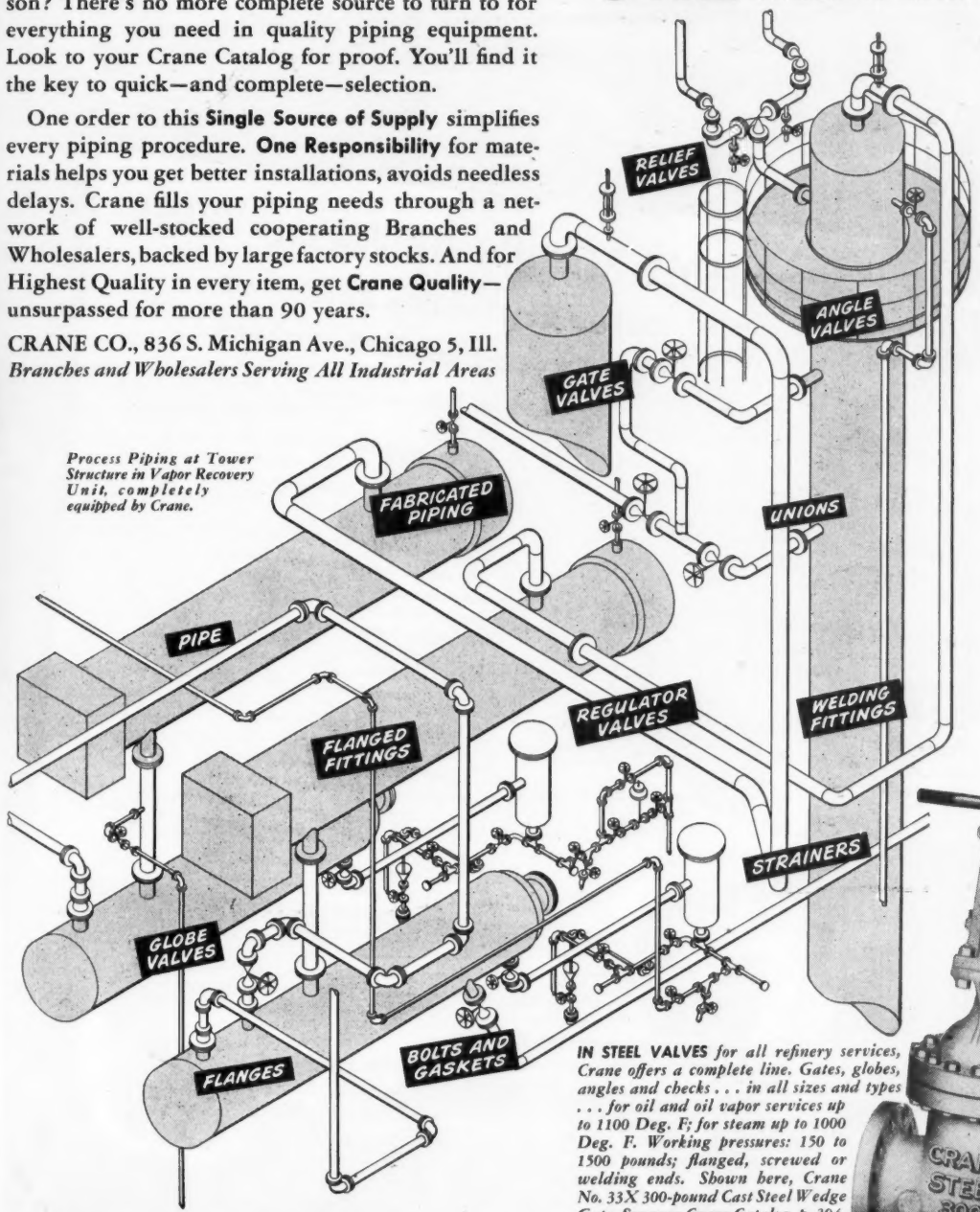
You name it...CRANE supplies it ...Everything in refinery piping

Take This Vapor Recovery Process Piping, for example. Throughout this maze of valves, fittings, pipe and accessories, one name stands out—CRANE. The reason? There's no more complete source to turn to for everything you need in quality piping equipment. Look to your Crane Catalog for proof. You'll find it the key to quick—and complete—selection.

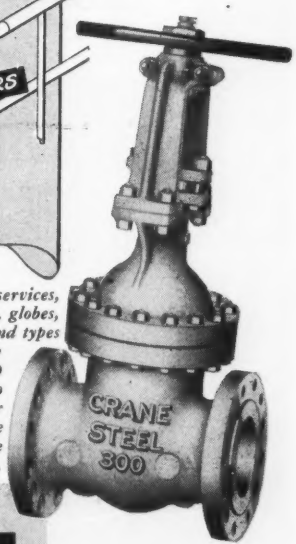
One order to this **Single Source of Supply** simplifies every piping procedure. **One Responsibility** for materials helps you get better installations, avoids needless delays. Crane fills your piping needs through a network of well-stocked cooperating Branches and Wholesalers, backed by large factory stocks. And for Highest Quality in every item, get **Crane Quality**—unsurpassed for more than 90 years.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



Process Piping at Tower Structure in Vapor Recovery Unit, completely equipped by Crane.



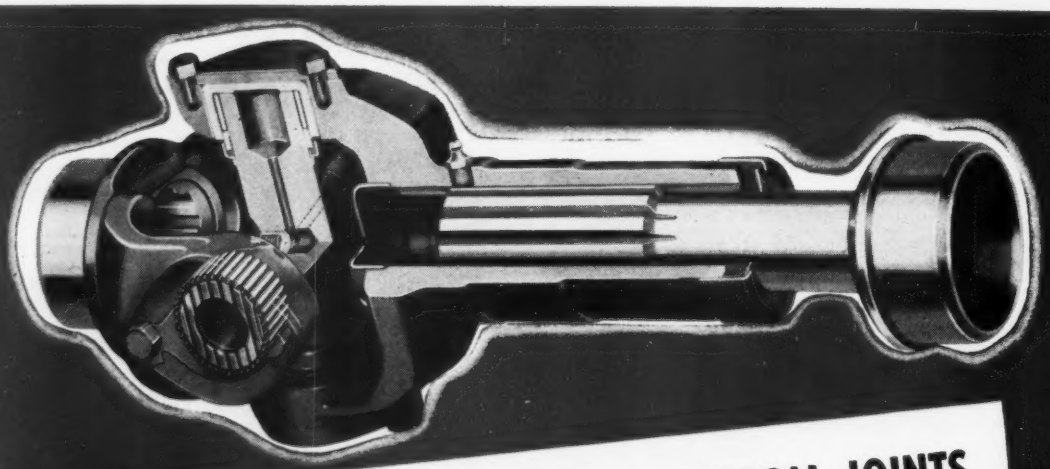
IN STEEL VALVES *for all refinery services, Crane offers a complete line. Gates, globes, angles and checks . . . in all sizes and types . . . for oil and oil vapor services up to 1100 Deg. F; for steam up to 1000 Deg. F. Working pressures: 150 to 1500 pounds; flanged, screwed or welding ends. Shown here, Crane No. 33X 300-pound Cast Steel Wedge Gate. See your Crane Catalog, p. 304.*

EVERYTHING FROM . . .

VALVES · FITTINGS
PIPE · PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM



Spicer

NEEDLE BEARING UNIVERSAL JOINTS

Offer Exclusive Features for Exceptional Services

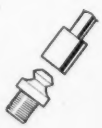
Design—Rigid one piece forged steel yokes and journal cross carry full torque load and provide precision needle bearing alignment. Simple—sturdy—reliable.

Material—Carefully heat-treated steel forgings to resist fatigue and shock loads. File-hard bearing surfaces to resist wear.

Accuracy—Precision fits and surface finishes assure vibrationless, trouble-free, dependable operation.

Balance—Spicer has unequalled facilities for maintaining very close limits of static and dynamic balance in all units.

Lubrication—After initial pressure lubrication, centrifugal action distributes reserve lubricant to bearing surfaces. Centrally located lubrication fittings allow refilling of lubricant reservoirs with shaft in installed position, without affecting original assembly or balance.



Types and Sizes—Every need in the automotive, industrial, and agricultural field is met by Spicer's broad range of designs and sizes.

Spicer engineers will help adapt Spicer Needle Bearing Joints to your particular needs.

SPICER MANUFACTURING
Division of Dana Corporation
TOLEDO 1, OHIO

45 YEARS OF Spicer SERVICE

TRANSMISSIONS • PASSENGER CAR AXLES
CLUTCHES • PARISH FRAMES • STAMPINGS
TORQUE CONVERTERS • UNIVERSAL JOINTS
SPICER "BROWN-LIPE" GEAR BOXES
RAILWAY GENERATOR DRIVES

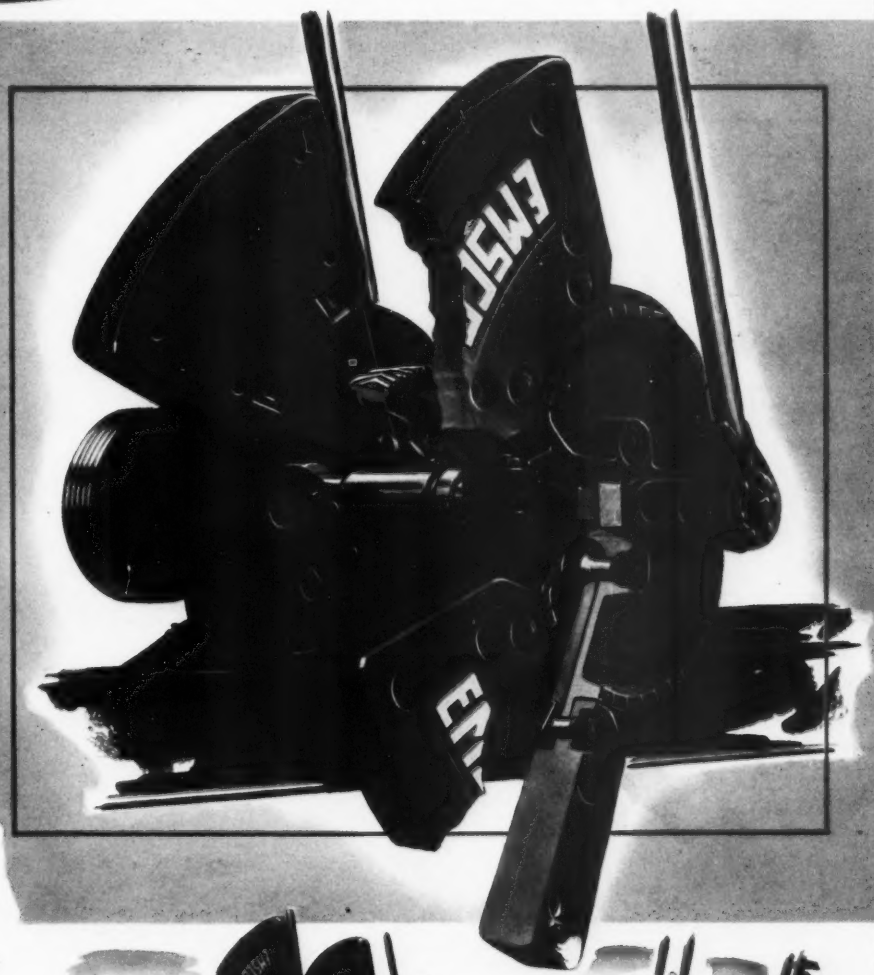
Perfect Counterbalancing

A ONE MAN OPERATION WITH EMSCO *PIVOTED* ROTARY COUNTERBALANCE PUMPING UNITS

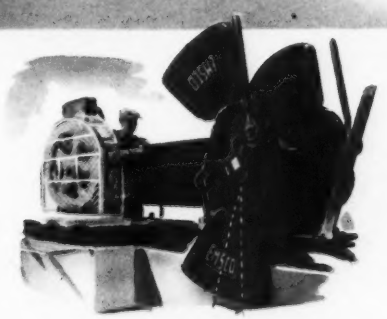
Profitable pumping requires a perfectly counterbalanced pumping unit. Without it, both surface and subsurface equipment are subjected to dangerous stress reversals. Power consumption fluctuates and entire operation is inefficient. Emsco pumping units are equipped with a special *pivoted* rotary counterbalance. Its design permits precise adjustments to be easily made by one man working at ground level.

The counterbalance weights are pivoted from the crank arms. They are clamped to the semi-circular tracks. No load is carried on the inside faces of the tracks. This permits weights to move freely on the crank arms and allows quick, safe and accurate adjustments. Any effect, from zero to maximum, can be obtained.

Ask your nearest representative for complete information on Emsco pumping units. Available in standard and floor-clearing units for shallow, medium and deep pumping, with a range of speeds and strokes to meet all requirements.



Weights at zero effect. To adjust: stop unit with lower weights about 15° off vertical. Loosen clamping bolts and weight will swing to vertical position. Tighten clamping bolts.



Disengage service brake. The upper counterbalance weight will cause unit to swing clockwise. Stop unit when weight has swung about 15° past vertical. Loosen clamping bolts and weight will swing to vertical position. Tighten bolts.

Repeat operation until weights are swung into the desired position. When weights are pivoted as far as possible from low speed shaft, maximum counterbalance effect is obtained. Adjustment markers are provided to facilitate operation.

CONTINENTAL

THE CONTINENTAL SUPPLY COMPANY

General Offices: DALLAS, TEXAS • Export Division: 30 Rockefeller Plaza, NEW YORK, N. Y. • Representatives: ARGENTINA • BOLIVIA • CHILE • COLOMBIA • ENGLAND JAVA • MEXICO • PERU • TRINIDAD • VENEZUELA

What's Your Pumping Problem?

Are your wells sanding up? Is high pressure gas or low gravity crude playing havoc with your production? Is corrosion causing abnormal wear and expensive pulling jobs and pump replacements? If you are troubled with these common pumping problems it will pay you to investigate D + B deep well pumps. For nearly a half century D + B has constantly directed its energies to the development of the finest pumping equipment to meet all subsurface conditions. Typical of D + B engineering achievements is the perfection of the new "Endurall" stainless steel pumps for extreme corrosive and abrasive service. Let a D + B representative show you how D + B pumps and sucker rods provide you more efficient and economical operation.

D+B

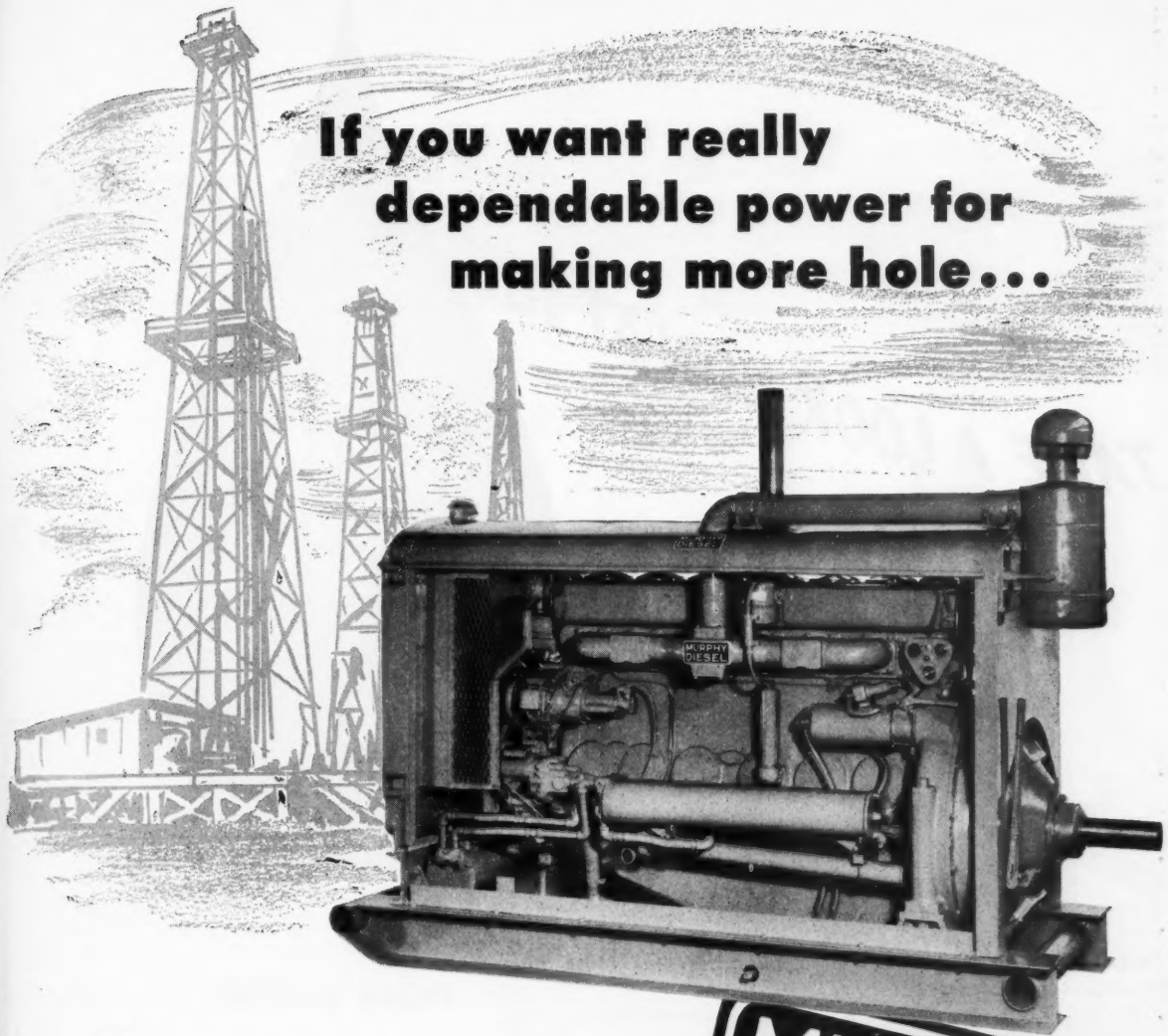
DEEP WELL PUMPS

"PACEMAKERS IN PRODUCTION EQUIPMENT DESIGN"

D+B DIVISION EMSCO DERRICK & EQUIPMENT COMPANY

Dallas, Texas ★ Los Angeles, California

If you want really dependable power for making more hole...



YOU'LL hit pay faster with power that doesn't konk out when the going gets tough. Murphy Diesels are rugged heavy-duty engines built to stand the gaff of 24-hour-a-day service without whimpering. Murphy Diesels will make more hole per gallon of fuel, too, because they are "True" diesels. Rugged construction and full rated output at 1200 RPM reduces wear and tear on the engine. Unit fuel injection system minimizes down time . . . Murphy Unit Injectors require less attention and on the rare occasions when it is necessary, can be removed and replaced in two minutes. It all adds up to long, dependable service with a minimum of trouble. Ask your Murphy Diesel Dealer to tell you the whole story or write direct.

MURPHY DIESEL COMPANY
5305 W. Burnham St., Milwaukee 14, Wis.

MURPHY DIESEL

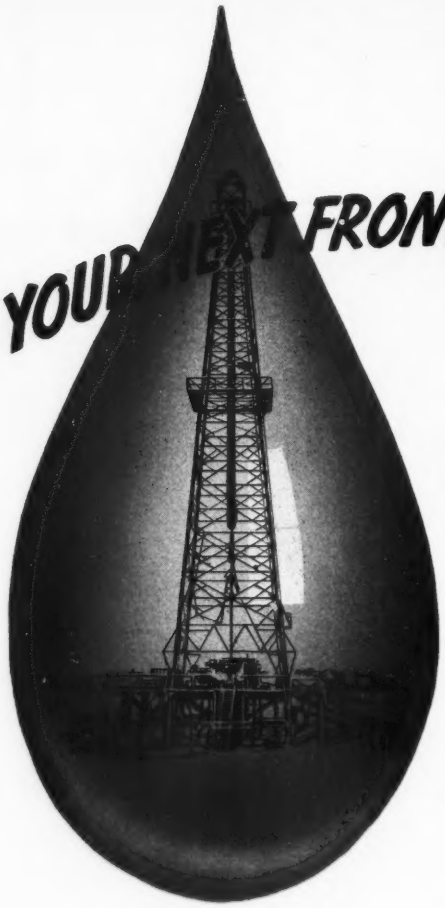
Heavy duty power

for the oilfields

Murphy Diesel Engines and Power Units for drilling and pipeline pumping, 90 to 190 H.P. Diesel-Electric generating Sets 60 to 116 K.W.

FACTORY BRANCH—Sales, Parts and Service: 113-117 South Elwood Street, Tulsa, Oklahoma

TAKE A LOOK NOW AT YOUR NEXT FRONTIER



Deeper exploration—like deeper drilling—requires more than average care and skill.

For many operators who are looking forward to deeper drilling as their next frontier, General's experienced crews are now compiling accurate data on prospective producing formations as deep as there are reflecting horizons—to the deepest sedimentary beds.

General crews are prepared to provide the extra care and skill required for deeper exploration. They are working with equipment specifically designed for deeper exploration, and they have a proven experience record of more than 14 years for accurately determining and locating conditions favorable to finding new oil.

When you are ready to take a good look at your next frontier, let General's specially designed equipment and experienced crews help you accurately explore deeper horizons for tomorrow's reserves.

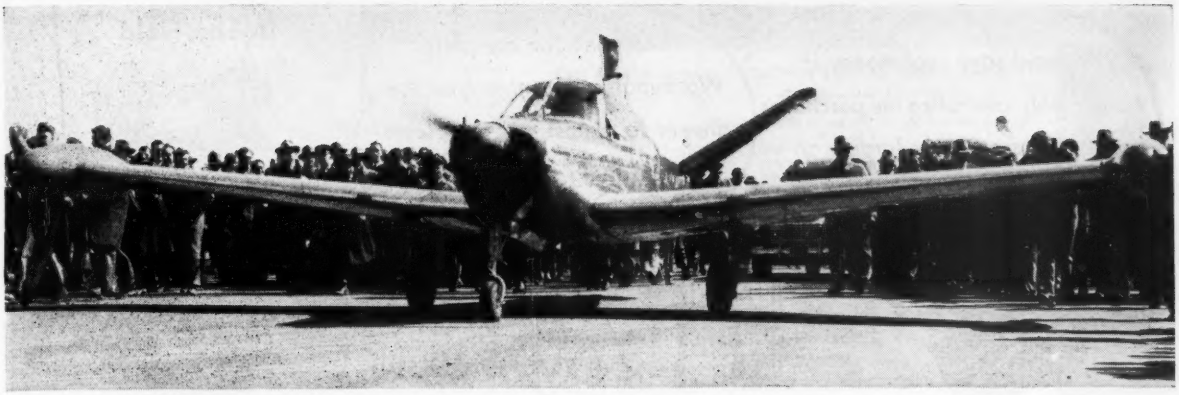
DOES DEEPER DRILLING GIVE YOU DEFINITE PROMISE FOR FUTURE OIL RESERVES?

GENERAL IS EQUIPPED WITH PORTABLE SEISMIC EQUIPMENT FOR USE WHERE FIELD CONDITIONS PROHIBIT USE OF CONVENTIONAL SEISMIC EQUIPMENT

General

GEOPHYSICAL COMPANY

HOUSTON



NEW WORLD DISTANCE RECORD

FOR LIGHT PLANES
SET BY

CAPTAIN BILL ODOM

AND HIS

BEECHCRAFT BONANZA

MARCH 7-8, 1949

HONOLULU — *Non-Stop To* — TETERBORO

4957.24 MILES

OFFICIALLY ACCREDITED GREAT CIRCLE DISTANCE

DISTANCE ACTUALLY FLOWN (Over water, 2474 miles — Over land, 2799 miles.)	5273 Miles
TIME EN ROUTE	36 Hrs., 2 Min.
TAKE-OFF WEIGHT	3858 Lbs.
GAS: Carried	288 Gals.
Used	272.25 Gals.
Remaining	15.75 Gals.
OIL: Carried	7.5 Gals.
Used	1.5 Gals.
Remaining	6.0 Gals.
EXTRA DISTANCE POSSIBLE ON FUEL UNUSED	372 Miles
AVERAGE GROUND SPEED, distance flown	146.3 MPH
AVERAGE MILES PER GALLON, distance flown	19.37 MPG
AVERAGE GALLONS PER HOUR	7.56 GPH
TOTAL COST OF GAS AND OIL	$75.00

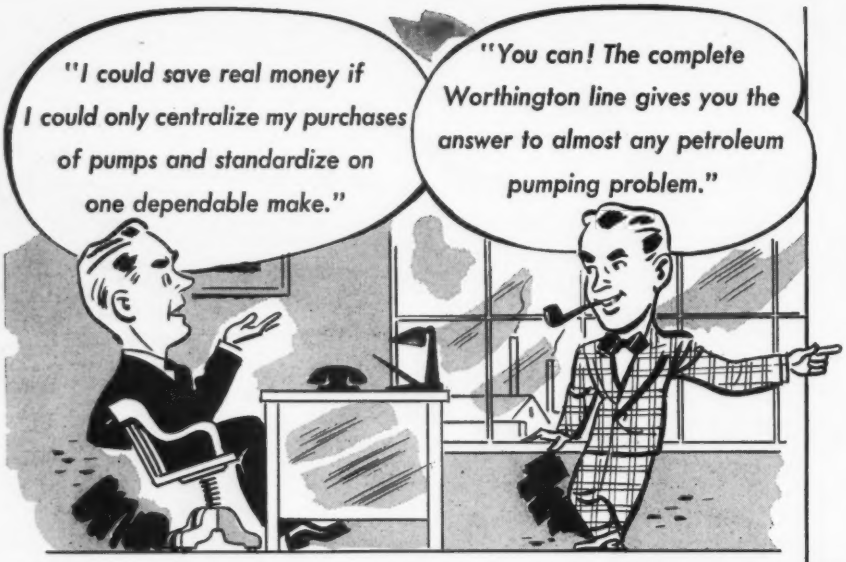
Apply Bonanza Transportation to your business

Company ownership of this fast, *quiet* plane turns travel days into travel *hours*—time saved you can put to *profitable* use. Investigate! A note on your company letterhead will bring an informative 60-page brochure on "The Air Fleet of American Business." Write today to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

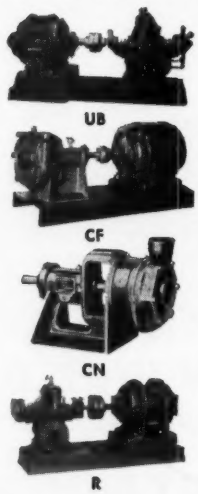
Top speed, 184 mph
Cruising speed, 170 mph
Range, 750 miles

BEECHCRAFT
BONANZA
MODEL A35

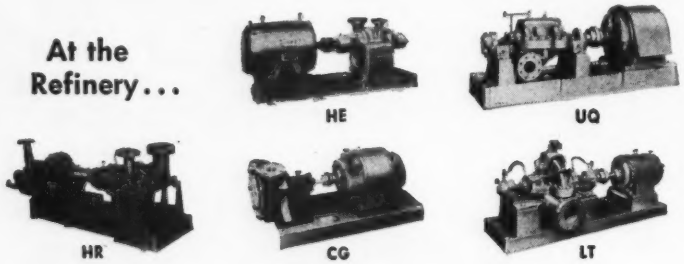
BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS


"I could save real money if I could only centralize my purchases of pumps and standardize on one dependable make."
"You can! The complete Worthington line gives you the answer to almost any petroleum pumping problem."

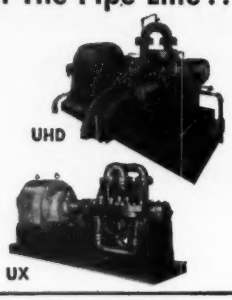
In The Field . . .



At the Refinery . . .



On The Pipe Line . . .



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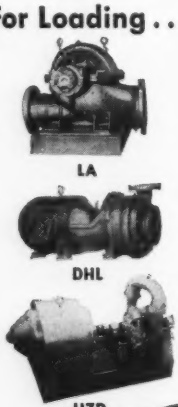


THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

LET WORTHINGTON WORK WITH YOU

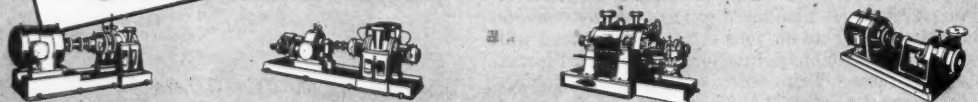
Yes, WORTHINGTON...the world's largest manufacturer of pumps . . . offers you complete service in petroleum pumps for applications in the field, in the refinery, on the pipe line and for loading operations. Why not take advantage of WORTHINGTON's long experience in petroleum pumping problems to lower your cost by standardizing on this single, dependable source?

For complete information on any specific pumping application that will prove *there's more worth in Worthington,* write: *Worthington Pump and Machinery Corporation, Centrifugal Pump Div., Harrison, New Jersey.*

MEMBER

WORTHINGTON

C8.4

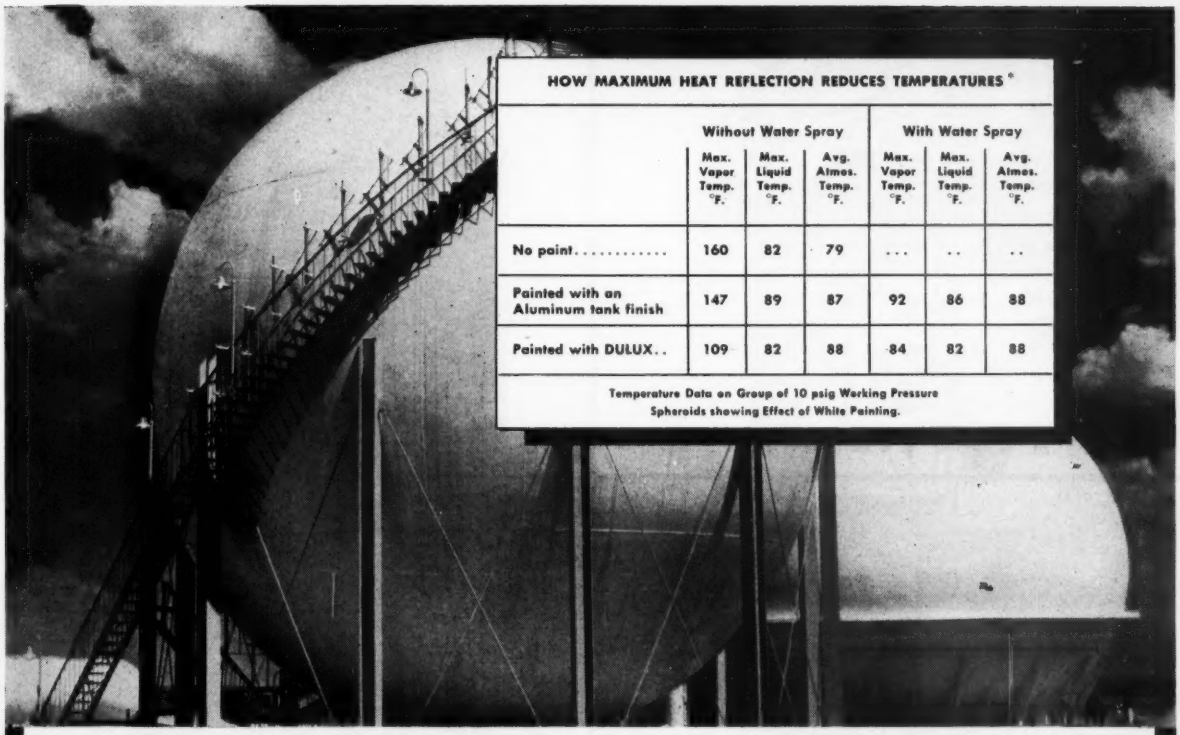


Types HR and HB. Twenty sizes. Capacities up to 1800 g.p.m. Developed heads up to 900 ft. Proper selection of material permits use for temperatures far below zero to 800°F., for pressures from high vacuum to 750 lb. per sq. in. gauge.

Type HD. Hydraulically-balanced, double-suction impeller handles boiling liquids with low submergence. Capacities range from 600 to 3200 g.p.m. at heads up to 700 ft., temperatures up to 850°F., pressures up to 550 lb.

Type WH. High-pressure, high-temperature, centrifugal hot-charge pumps. Twelve distinct points of superiority, based on years of experience building pumps for high pressures and temperatures. Capacities to 2000 g.p.m., heads to 5000 ft.

Type HL. Several construction arrangements permit flexibility in application. Designed for temperatures up to 225°F., or higher with water-jacketed stuffing box. Capacities up to 1600 g.p.m., heads to 500 ft.



HOW MAXIMUM HEAT REFLECTION REDUCES TEMPERATURES*

	Without Water Spray			With Water Spray		
	Max. Vapor Temp. °F.	Max. Liquid Temp. °F.	Avg. Atmos. Temp. °F.	Max. Vapor Temp. °F.	Max. Liquid Temp. °F.	Avg. Atmos. Temp. °F.
No paint.....	160	82	79	...	..	..
Painted with an Aluminum tank finish	147	89	87	92	86	88
Painted with DULUX..	109	82	88	84	82	88

Temperature Data on Group of 10 psig Working Pressure Spheroids showing Effect of White Painting.

Du Pont DULUX Tank White

REG. U. S. PAT. OFF.

pays its own way . . . and more!

You can readily see why Du Pont DULUX Tank White is fast becoming the favorite tank finish in the petroleum industry when you study the chart above. It shows how the superior heat-reflecting ability of DULUX *lowers* interior tank temperatures . . . and thereby *minimizes* heavy evaporation losses in warm weather.

Using DULUX pays other dividends, too. DULUX provides unusually high resistance to premature corrosion, common fumes and industrial gases. DULUX means low repaint costs because less extensive surface preparation is required. And through its self-cleaning feature, DULUX stays white . . . gives *years* of maximum heat reflection!

To get long-term protection at low maintenance cost . . . to preserve the quantity and quality of your product at its peak . . . finish with Du Pont DULUX Tank White!

READ HOW *Du Pont DULUX Tank White can save you money two important ways. Send coupon today for "BEAT THE HEAT," an informative booklet complete with charts and other technical data on DULUX.*

Send for Free Booklet Today!

*Table from National Petroleum News, Technical Section

E. I. du Pont de Nemours & Co. (Inc.)
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Please send, free of charge, your new illustrated booklet **"BEAT THE HEAT."**

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*Firm*_____

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DU PONT
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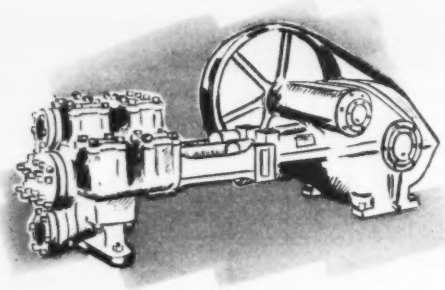
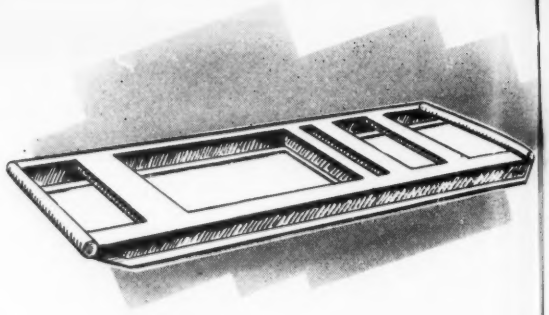
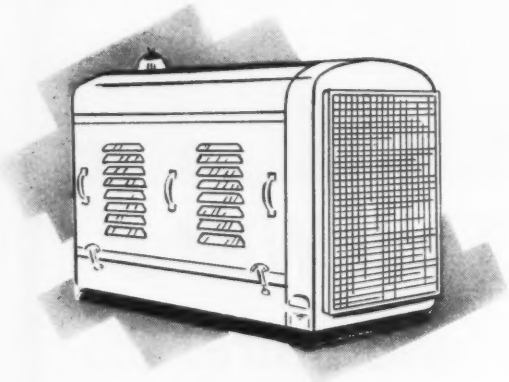
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*



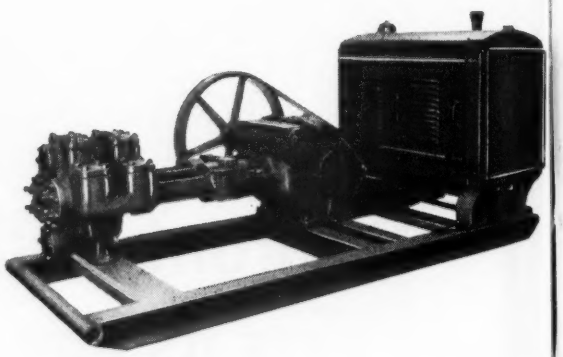
A Gaso pump



+ a Gaso skid



+ a dependable power unit



+ Gaso hook-up & assembly

GP

= a complete and completely efficient pumping plant

Simple Arithmetic

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GASO PUMPS
for every oil industry need

GASO PUMP & BURNER MFG. CO.

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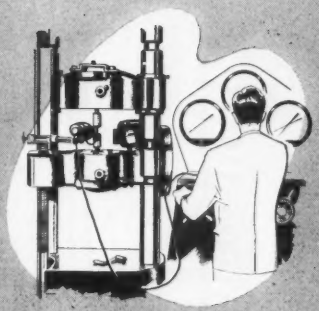
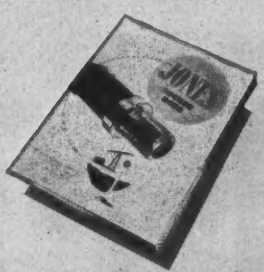
"LOOK FOR THE GREEN RODS"

PREDETERMINING SUCKER ROD SERVICE



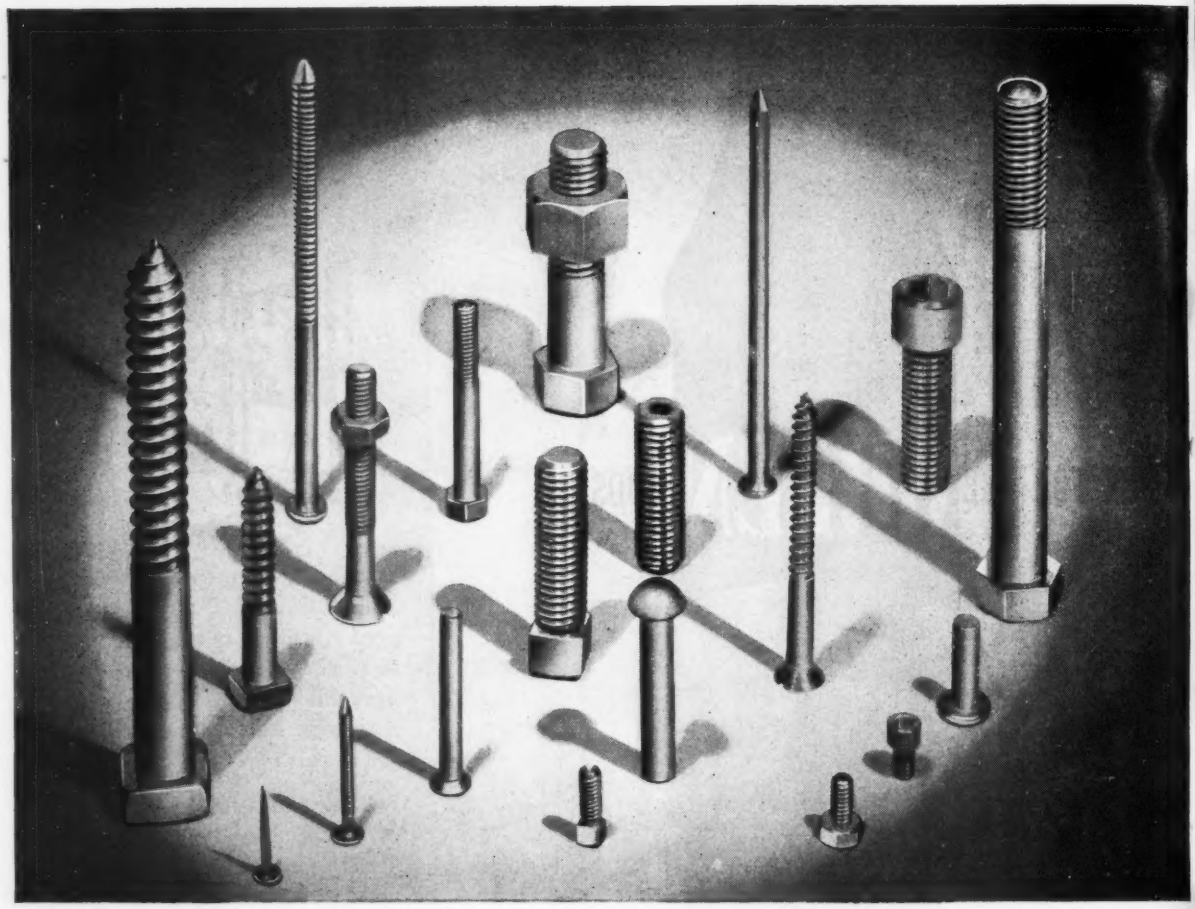
The final test of properly selected Jones sucker rods is their ability to provide satisfactory extended service in field operation. Before they leave the factory, every effort is made to be sure that they will meet and surpass requirements.

Rigid tests predetermine compliance with standards well within API specifications. These standards are based on field experience and engineering knowledge accumulated during more than 50 years of leadership. They are your assurance of the best in sucker rods.



*In the new Jones Catalog, the precise production of rods and couplings is illustrated and described. Copies will be sent on request.

***THE S. M. JONES COMPANY**
(Subsidiary of Buffalo Bolt Company)
General Office and Factory: TOLEDO, OHIO
Sales Office: Kennedy Building, Tulsa, Okla.
Export Sales Office: Buffalo International Corp.
50 Church Street, N. Y. C.



20 Ways To Stop Trouble Before It Starts!

How A Textile Company Put Monel Fastenings To Work

Problem: Piece goods, dripping with a sulfuric acid solution, were being transported in wooden carts. Maintenance of the carts was a constant chore, because the acid attacked the nails holding them together. Continual moisture also weakened the nails' grip, causing them to "back out."

Solution: Both problems were ended by using the Monel fastening shown at left (Monel "Anchorfast" nail, made by Independent Nail and Packing Co., Bridgewater, Mass.). The Monel nails remained unaffected by the acid; the annular grooves around their shanks made them hold like screws.

WE WANT TO HEAR ABOUT YOUR TOUGHEST FASTENING PROBLEM. WE THINK WE HAVE THE ANSWER IN MONEL

For most jobs ordinary fastenings are adequate.

But there are plenty of jobs where you need extra protection against rust...corrosion...shock...overstressing...vibration...heat...cold.

For those jobs you need the protection of *Monel**.

Just look at the "extras" you get from Monel fastenings.

They resist corrosion by caustics, most acids, salt water. They're 100% rustproof.

Even their mechanical properties are superior. For, compared to the free-cutting steel used in ordinary fastenings, Monel is 20% stronger ...30% more ductile...40% tougher.

And if extreme temperatures must be endured, you'll find Monel fastenings safe at high heat or sub-zero cold.

How many places in your plant or product do you want (*and need*) the extra advantages of Monel fastenings? Remember, *any* fastening you need is available in longer-lasting Monel.

TEST A MONEL FASTENING, FREE! Write to Bob Johnson of Inco. Tell him the type and size you need. He'll send a sample... plus the address of your nearest supplier.

EMBLEM OF SERVICE INCO

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street, New York 5, N. Y.

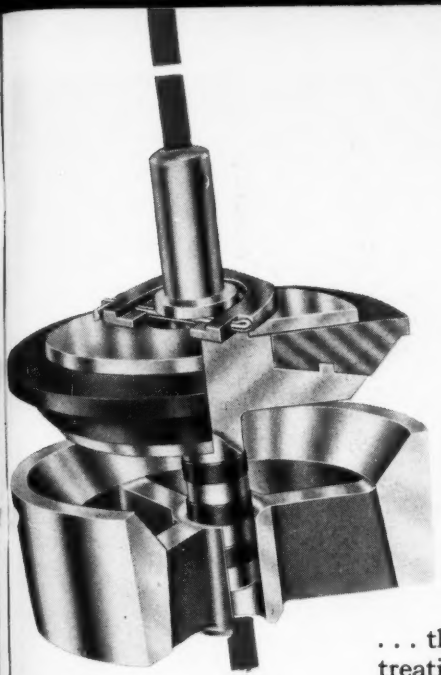
*Reg. U. S. Pat. Off.

Monel* Fastenings are stronger..tougher..safer

AMERICAN IRON VALVES & SEATS

HEAT TREATED

in our new controlled atmosphere furnace!



There's a *big* difference in the performance of every product that receives this advanced method of heat treating! That's why every American Iron Valve & Seat is heat treated in our new controlled atmosphere furnace. First comes the quenching furnace (shown below) . . . next, the oil quenching unit (right of furnace) . . . third, the draw heat furnace (at rear right). Here's a heat treating process that spells q-u-a-l-i-t-y, every step of the way! And it's another example of how—from start to finish—our valves and seats are not only *designed right*, but *made right*, for long-lasting, outstanding performance!

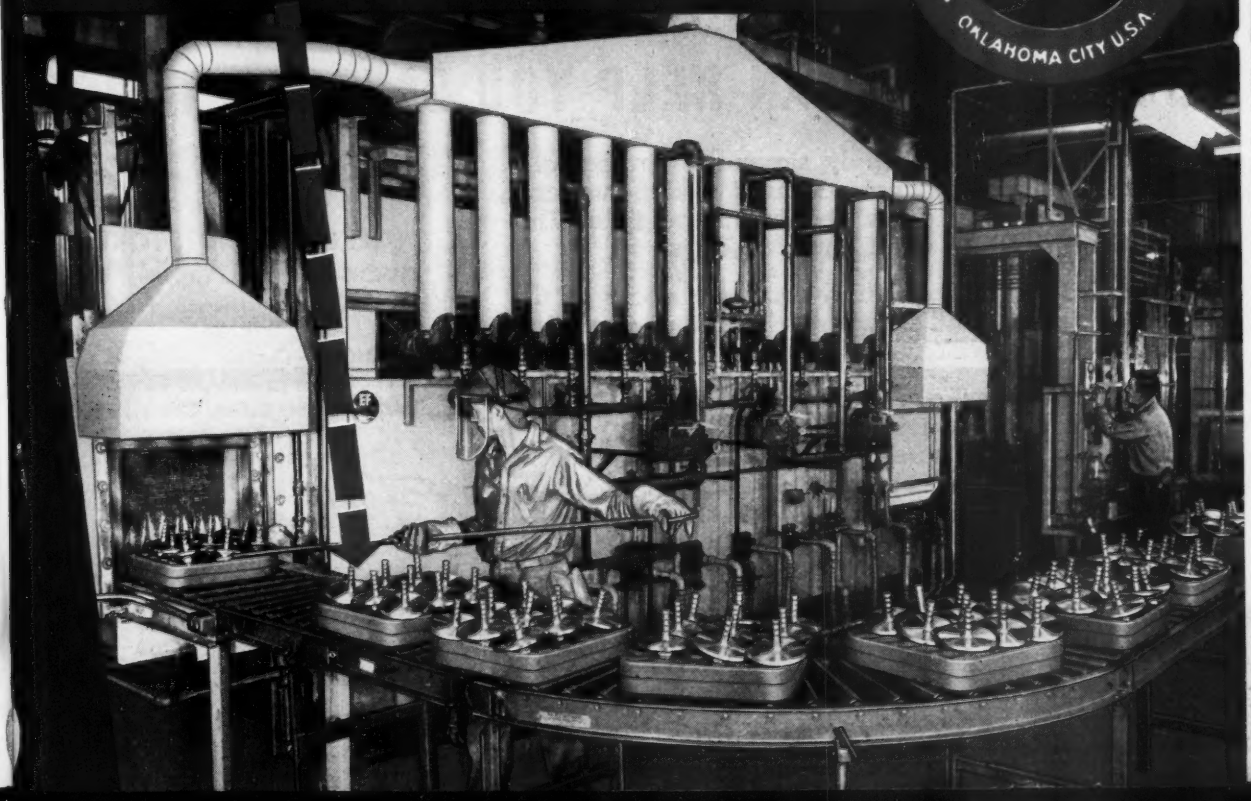
AMERICAN IRON & MACHINE WORKS CO.

OKLAHOMA CITY, OKLAHOMA—BOX 1177—PHONE L. D. 518—DISTRICT OFFICE, HOUSTON, TEXAS

EXPORT OFFICE: 420 LEXINGTON AVE., NEW YORK CITY, N. Y.

AMERICAN IRON & MACHINE WORKS CO. · A · OKLAHOMA CITY U.S.A.

(below) Charging the controlled atmosphere furnace for the continuous heat-treating operation applied to every American Iron Valve & Seat.



SUPPLY BOVAIRD COMPANY

BOVAIRD CAN HELP YOU SAVE ALL THREE!

Bovaird's offices and supply stores are strategically located throughout Illinois, Kansas, Oklahoma and Texas to give you quick service in the field. This SAVES MINUTES — even hours or days.

In Bovaird stores you'll find complete stocks of the finest equipment and supplies to be had at any price. This SAVES MONEY when you "Buy From Bovaird."

Bovaird supplies are field tested and proven to give you long, dependable, trouble-free service under the most severe field conditions with minimum down time. This SAVES MANPOWER.

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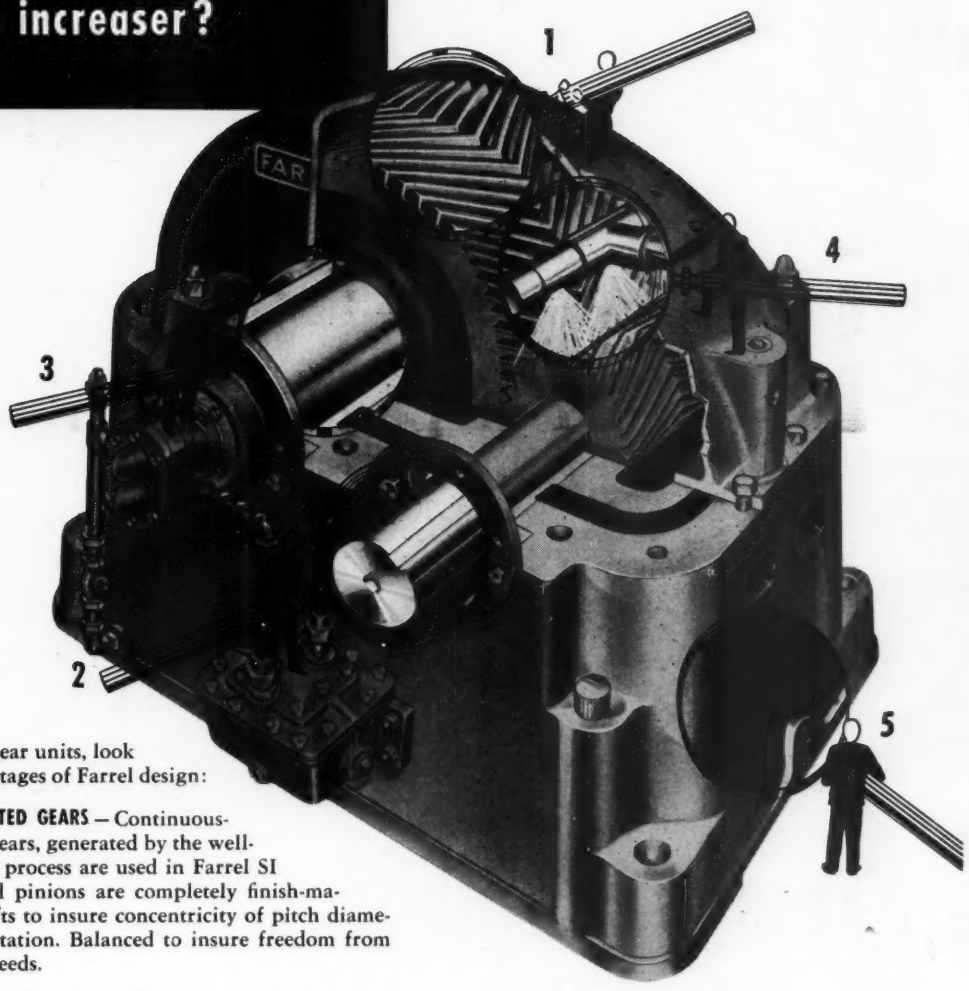
"Buy From Bovaird"

THE BOVAIRD SUPPLY CO

GENERAL OFFICES: TULSA, OKLAHOMA

What do YOU look for in a speed increaser?



Before you specify gear units, look into the many advantages of Farrel design:

1. PRECISION GENERATED GEARS – Continuous-tooth herringbone gears, generated by the well-known Farrel-Sykes process are used in Farrel SI units. All gears and pinions are completely finish-machined on their shafts to insure concentricity of pitch diameters with axes of rotation. Balanced to insure freedom from vibration at high speeds.

2. LARGE, OVERSIZE SHAFTS—You will find these shafts large for the power to be transmitted, giving added stiffness against bending and torsional deflections under peak loading variations. Finish-ground to close accuracy.

3. PRECISION-FINISHED BEARINGS – Split steel shells lined with high-grade babbitt are used. The babbitt is centrifugally poured, resulting in a bonded unit structure. Bearings are finished to same close tolerances held in shafts and other elements.

4. SELF-CONTAINED CIRCULATING OIL SYSTEM—The Farrel system provides pressure lubrication for all bearings and spray lubrication at the mesh line of the gears. A completely self-contained system, integral with the unit. Oil cooler included.

5. HEAVY, RIGID HOUSING – This housing is an exceptionally rigid structure to insure the operating smoothness of the precision-generated gearing.

Farrel speed increasing units are available in 49 standard sizes with speed ratios ranging from 1:1 to 12:1. For higher ratios, units using two sets of gears are supplied with ratio range from 12:1 to 40:1.

For full information, send for new Bulletin No. 448.

FARREL-BIRMINGHAM COMPANY, INC.
344 VULCAN ST., BUFFALO 7. N. Y.
Plants: Ansonia and Derby, Conn.; Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles.

OIL FIELD REPRESENTATIVES
Hercules-Lupfer Engine Sales Co., 124 N. Boston St., Tulsa 1, Oklahoma
V. W. Osborne, 822-A M & M Building, Houston 2, Texas

Farrel-Birmingham

FARREL

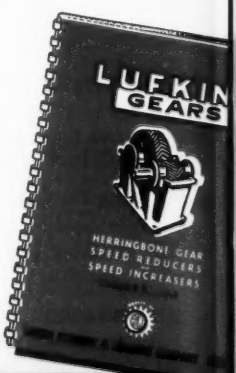
FB-479

THE Lufkin Line...

There's Nothing as Fine!

"There is Nothing as Fine as the LUFKIN LINE" is not a "Catch-Phrase" but the statement of operators the world over. The results of more than a quarter century of specializing in the manufacture of oil well pumping equipment places LUFKIN in leadership position—a fact readily agreed upon by oil men everywhere. Special applied skills in manufacturing, plus constant research directed towards improvement of its product is Lufkin's way of maintaining its enviable industry position.

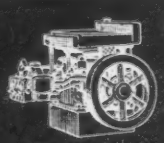
LUFKIN builds a complete line of commercial industrial gear reducers and speed increasers. More than 60,000 gear sets have been produced in our Lufkin plant. Write for Catalog G-1 today.

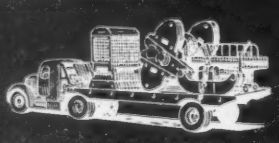


LUFKIN FOUNDRY & MACHINE COMP
LUFKIN, TEXAS

Branch sales and service: Houston, Dallas, Tulsa, Los Angeles, New Seminole, Oklahoma City, Corpus Christi, Odessa, Kilgore, Wichit Casper, Great Bend.

LUFKIN PUMPING UNITS

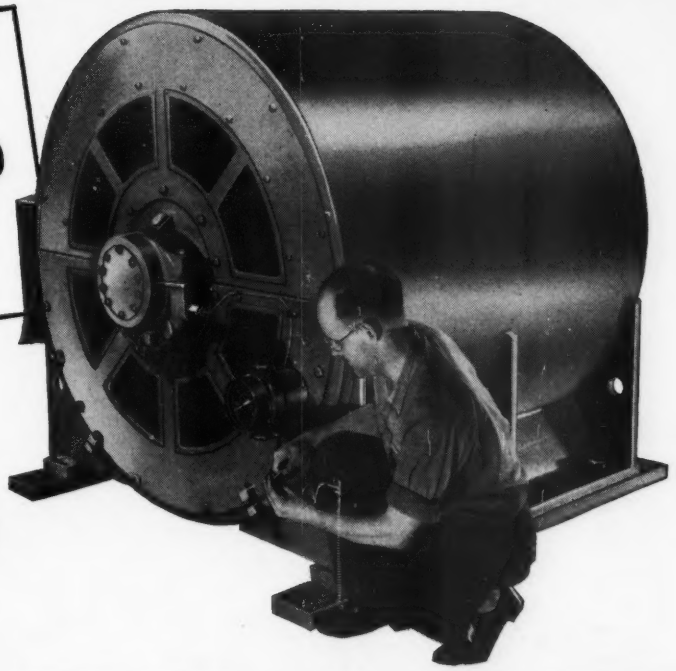

LUFKIN-COOPER-BESSEMER ENGINES


LUFKIN OIL FIELD AND INDUSTRIAL TRUCK TRAILERS

INDUSTRIAL SPEED REDUCERS AND INCREASERS

DIVISION LUFKIN FOUNDRY & MACHINE COMPANY INDUSTRIAL, MILL AND AUTOMOTIVE SUPPLIES

TUBE-TYPE TOTALLY-ENCLOSED FAN-COOLED MOTORS!

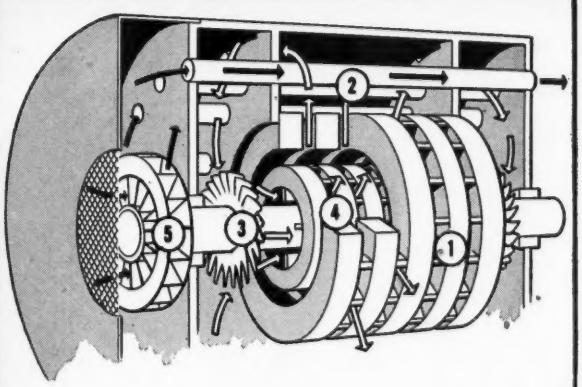


DIRT-

AND CORROSION-RESISTANT!

PROOF!

How Tube Cooling Works



Stator core (1) is surrounded by tubes (2). Internal fans (3) circulate air through ducts (4) in rotor and stator and around tubes, transferring heat to tubes.

External fan (5) drives outside air through tubes, removing heat and keeping tubes clean. All electrical parts are enclosed. Dirt cannot enter.

- **Install anywhere – indoors or out**
- **Heat exchanger is practically *self-cleaning***
- **Sizes . . . 75 to several thousand horsepower**

THIS ALLIS-CHALMERS tube-type TEFC* motor practically eliminates cleaning and other high maintenance costs associated with large motors exposed to dirty and corrosive atmospheres. And it does this with a simple, self-contained, tube-type, ventilating system.

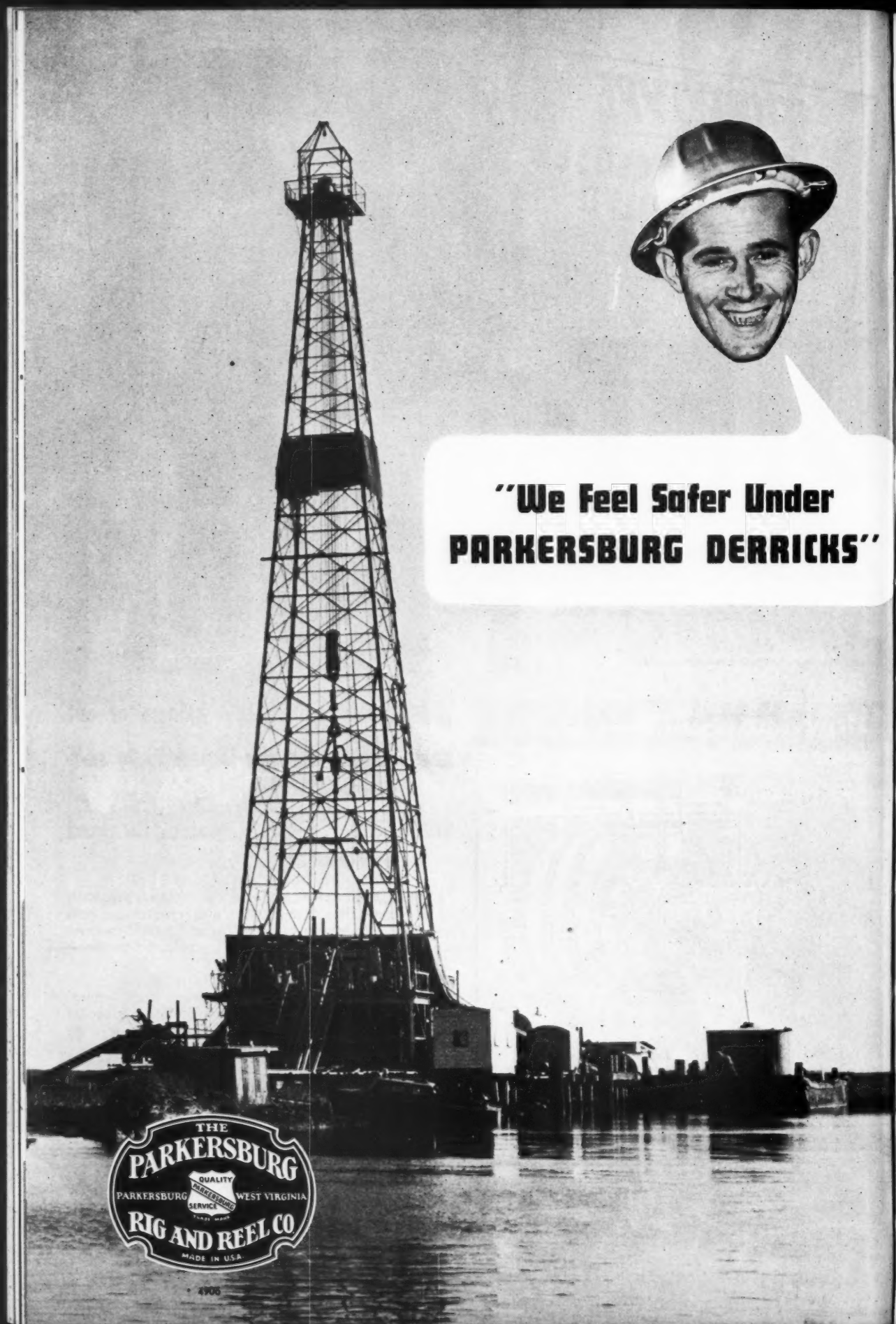
All electrical parts — including the stator core — are enclosed. The simple heat transfer system keeps temperatures well within rated limits. Cleaning is rarely needed because air passages are unrestricted. Air flow through the straight tubes removes foreign matter.

Three years of field operation have proved important savings. Sizes from 75 hp and up. Also explosion-proof designs. For complete information, outline your requirements to your A-C Sales Office, or write for Bulletins 05B7150 and 51R7149. A 2664

ALLIS-CHALMERS, 1059A SO. 70 ST.
MILWAUKEE, WIS.

*Totally-Enclosed Fan Cooled

ALLIS-CHALMERS


"We Feel Safer Under
PARKERSBURG DERRICKS"
THE
PARKERSBURG
RIG AND REEL CO
QUALITY
SERVICE
PARKERSBURG WEST VIRGINIA
MADE IN U.S.A.
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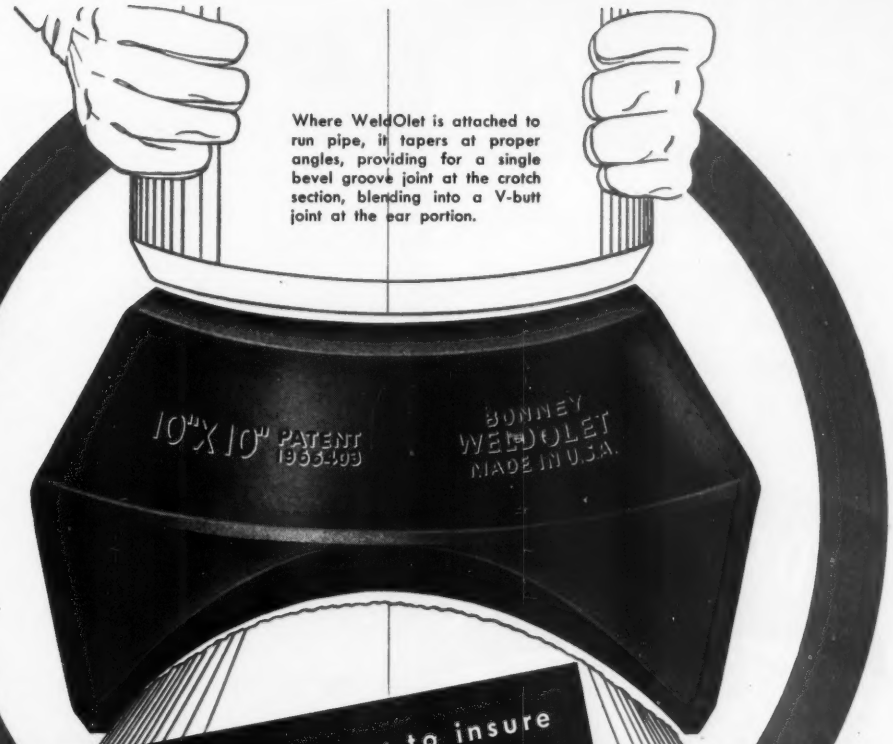

Where WeldOlet is attached to run pipe, it tapers at proper angles, providing for a single bevel groove joint at the crotch section, blending into a V-butt joint at the ear portion.

The quickest — most economical — way to insure FULL PIPE STRENGTH AT BRANCH CONNECTIONS

WeldOlets*, with outlet sizes from ⅛" to 24", both straight and reducing, need no additional reinforcement to establish and fully maintain original strength on ASTM A-106 Seamless Steel Grade A Pipe, as set forth in Code for Pressure Piping, American Standards Association, B31.1-1942, and Supp. No. 2, B31.1b-1947. WeldOlet welding fittings provide the quickest, most economical, most *satisfactory* method of obtaining *full pipe strength* at branch connections. For detailed engineering reference data, write for Catalog W-2.

BONNEY FORGE & TOOL WORKS

FORGED FITTINGS DIVISION • 366 GREEN STREET • ALLENTOWN, PENNA.
Authorized Canadian Distributor: Sterling Steel Co., Ltd., 20 Temperance St., Toronto 1, Canada
MANUFACTURERS OF FAMOUS BONNEY TOOLS

Fig. 1—Cut-away view of reducing size WeldOlet with welding outlet in place. The external rib and wide bases or footings of WeldOlets* eliminate the need for *extra supports* to take care of bending or vibrational stresses at crotch section, the point of greatest stress.

Fig. 2—Note blending of ear portion of welding fitting to run pipe. Extension of weld metal below inside scarfed portion of pipe insures all sections of joint greater than pipe wall thickness.

WELDOLETS

*Trade Mark Reg. U.S. Pat. Off. Pat. in U.S. & Foreign Countries

FOR WELDED BRANCH PIPE OUTLETS

When you want Bonney Welding Outlets, ask for WeldOlets*

Hydraulic POWER* STEER

TURNS WHEEL Easily

EVEN THOUGH THE OSHKOSH* TRUCK IS STANDING STILL

Even the six year old child (shown above) can turn the big front wheels of an Oshkosh Truck with one hand although the truck is in stationary position. Just a touch of the steering wheel and the hydraulic power steer maneuvers the wheels - - a mighty important factor in soft terrain.

These features combine to make Oshkosh the all purpose truck for oil field use: All Wheel Drive; Hydraulic Power Steer; Maximum Maneuverability; Heavy Duty Oversize Industrial Type Radiator; Sturdy Frames and Axles; Air Actuated Brakes; Rugged Transmissions; Hydraulic Coupling; Powerful Engine.

See Oshkosh Mid-Continent representatives for the complete Oshkosh Story.

OSHKOSH MOTOR TRUCK, INC.
OSHKOSH, WISCONSIN

Mid-Continent Representatives

GARDNER-PRICE COMPANY
Wright Building
TULSA, OKLA.

OSHKOSH

4 and 6 WHEEL DRIVE TRUCKS FOR OIL FIELDS

CABLE ADDRESS: "OSHMOTOR" OSHKOSH

MY-LO-JEL

THE New MAGCOBAR STARCH LOWERS WATER LOSS AND KEEPS IT LOW!

Magcobar MY-LO-JEL is an improved pregelatinized drilling mud starch in the form of a free flowing powder which can be added directly to the mud through a hopper mixer. It provides positive control of the filtration properties of mud even in the presence of salt, anhydrite and other contaminants. MY-LO-JEL is a blended starch that is especially processed to produce a quick acting, tough and chemically stable plugging agent to inhibit filtration of mud. Thus, it not only lowers the water loss, but keeps it low.

MY-LO-JEL is economical to use. Two to four pounds per barrel of mud is all that is needed to impart the low water loss desired of most muds. It has a stabilizing effect on mud which often greatly reduces the cost of maintenance while drilling. Low water loss muds made with MY-LO-JEL are doing much to hold down the present day cost of drilling by eliminating strings of protection casing, preventing delays due to reaming, hole trouble and fishing jobs.

MAGNET COVE BARIUM CORP.
MALVERN, ARK. HOUSTON, TEXAS

Export Representative: GUY E. DANIELS
30 Rockefeller Plaza, New York 20, N. Y.

Look for this sign **WHEN YOU NEED MUD**

MAGCOBAR • MAGCOGEL • HIGH YIELD DRILLING MUD • XACT CLAY • FIBER-SEAL • MAGCO-MICA • TANNATHIN • JEL-OIL MUD • JEL-OIL "E" • SALT GEL • NOHEEV • SEAL FLAKES • MY-LO-JEL • CHEMICALS

Magcobar
Complete
DRILLING MUD SERVICE
DEALER

LIFT MORE FLUID with the BEST SWAB MADE

The Guiberson TYPE "K" SWAB with TWO TYPES of CUPS

Field men have never hesitated to acclaim the Guiberson Type "K" Swab the best in the industry—and now it is offered with *two distinct types of cups*, to do more jobs for you and do them *better*.

The STANDARD "K" CUP for the day-in, day-out job—lifts more fluid with every trip . . . for deep or shallow wells —wire basket runs at full speed past tubing gaps without loss of fluid or damage to cup.

TYPE "K" CASING SWAB WITH "K" CUPS →

TYPE "K" CASING SWAB WITH "GW" CUPS →

The NEW "GW" CUP is the perfect answer when you're swabbing in old wells . . . in mixed strings . . . in bad pipe. It's ideal for wells with low fluid level, or for taking water off of gas wells. The "GW" brings up the last cupful!

Both of these fine cups are made of a special oil-resistant compound—resilient, yet strong and long-wearing. Made in all tubing and casing sizes . . . quickly and easily interchangeable.

All Guiberson Swabs utilize the correct swabbing principle!

Reg. U. S. Pat. Off.
Established 1919

Guiberson U.S.A.

THE GUIBERSON CORPORATION

Dallas, Texas

California Distributor: The W. R. Guiberson Co., 717 East Gage Avenue, Los Angeles 1

Branch Offices: 30 Rockefeller Plaza, New York 20, N. Y.

Tulsa, Okla.; Longview, Kilgore, Houston, Alice, Odessa and Wichita Falls, Texas; Lafayette, La.; Wichita, Kansas; and Newark, Ohio.

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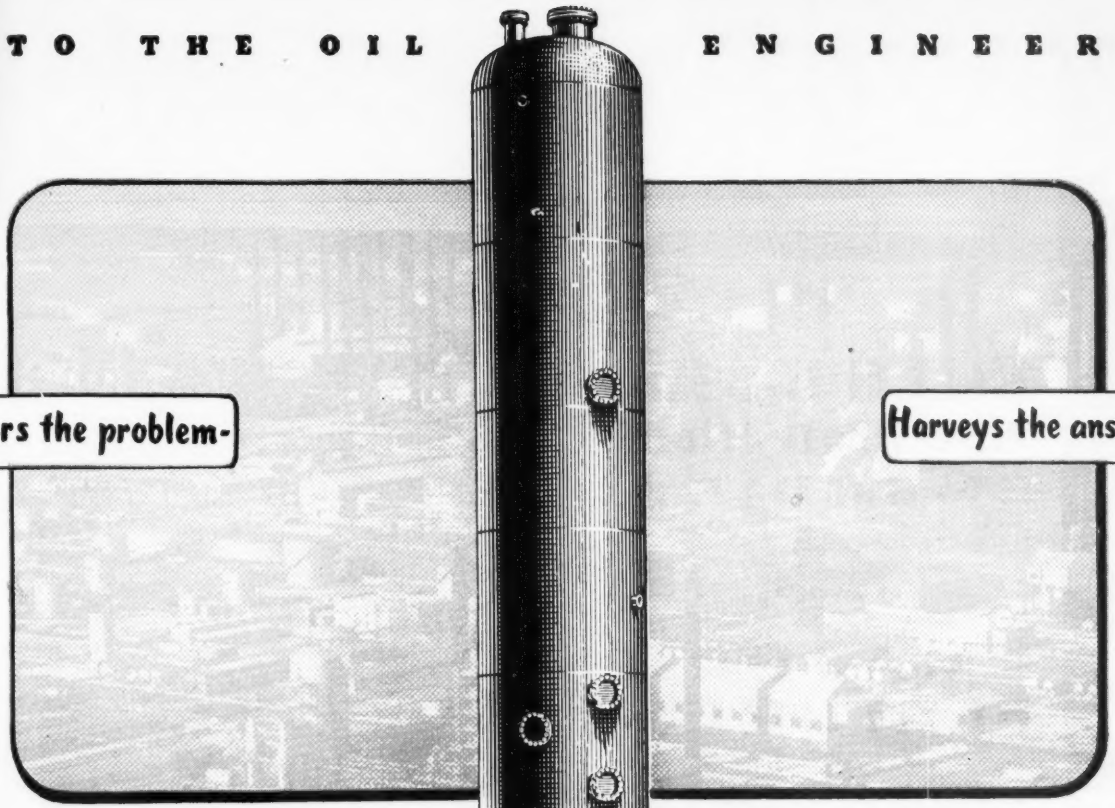
TO THE OIL ENGINEER



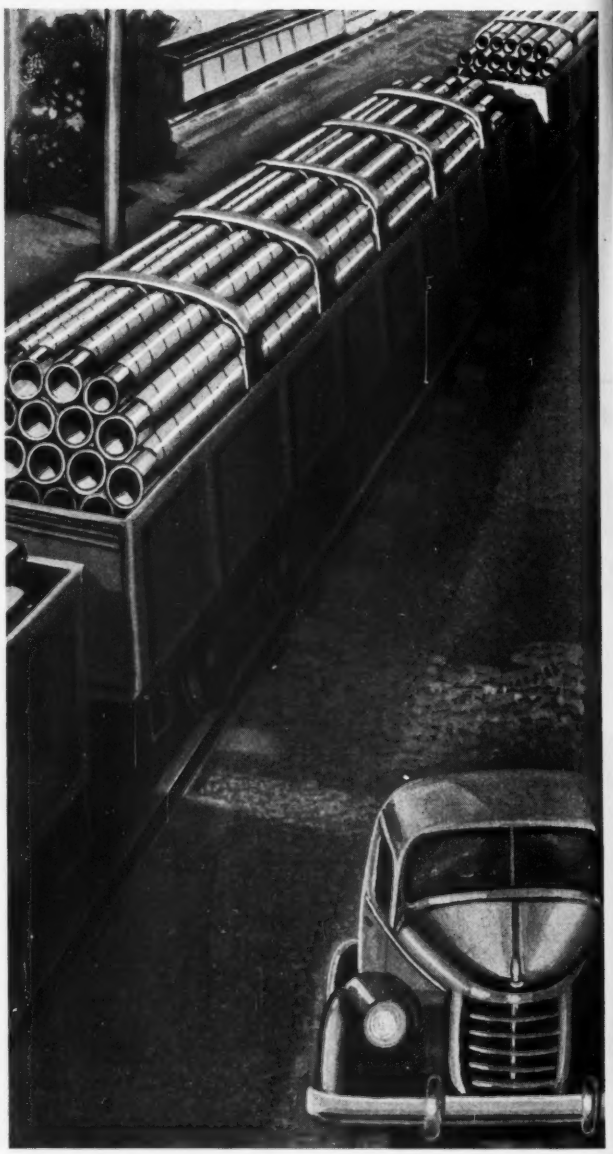
ause Harveys have one of the most modern complete plants in the world, housing to-date welding equipment, operated by experienced staff, they can supply the wer to even the most complicated plate- k problem. Fabricating mild, alloy, or l steels they can produce installations to of the recognised codes, including Lloyds A.P.I.-A.S.M.E. with, if necessary, X-ray mination and stress-relieving by heat treatment. Shop assemblies range from a few inches to 15' 0" in diameter; pressure from absolute to 3000 lbs. per sq. in. This illustration gives but an impression of the type of flash Fractionating Tower that Harveys have produced for one of their overseas customers. Recent orders include Vessels 110 ft. high by 25 ft. in diameter, weighing up to 125 tons.

Send for Catalogue OG 750.

A. Harvey & Co. (London) Ltd. **Harvey** Woolwich Road, London, S.E.7

HILL HUBBELL PIPE PROTECTION

HILL, HUBBELL
Pipe Protection
EMBODIES
4
MAJOR FEATURES



1. LEADERSHIP AND RESPONSIBILITY

TWENTY-FIVE YEARS of PROGRESSIVE LEADERSHIP established through satisfied customers, assures your coating and wrapping, to your exacting specifications, on scheduled deliveries without costly delays.

2. MODERN PLANT FACILITIES

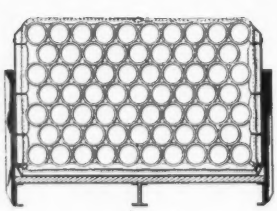
TWENTY-FIVE YEARS of PROGRESSIVE ENGINEERING has developed the most modern coating and wrapping techniques used in the industry, including caustic dipping and rinsing tanks for the removal of all oil and grease from pipe before processing.

3. SPECIFICATIONS

Your EXACTING specifications for all standard coatings using asbestos felt or glass pipe wrap, on all standard pipe sizes from ¾″ nominal to 26″ O.D., is followed with precision performance assuring the maximum protection of your pipe lines.

4. LOADING

Our unit car loading system for the shipping of coated and wrapped pipe developed by HILL, HUBBELL and universally used by the industry, assures arrival of your processed pipe to destination in the same sound condition as it leaves the plant.



CONSULT WITH US ON YOUR PIPE PROTECTION REQUIREMENTS

Hill, Hubbell and *Company*

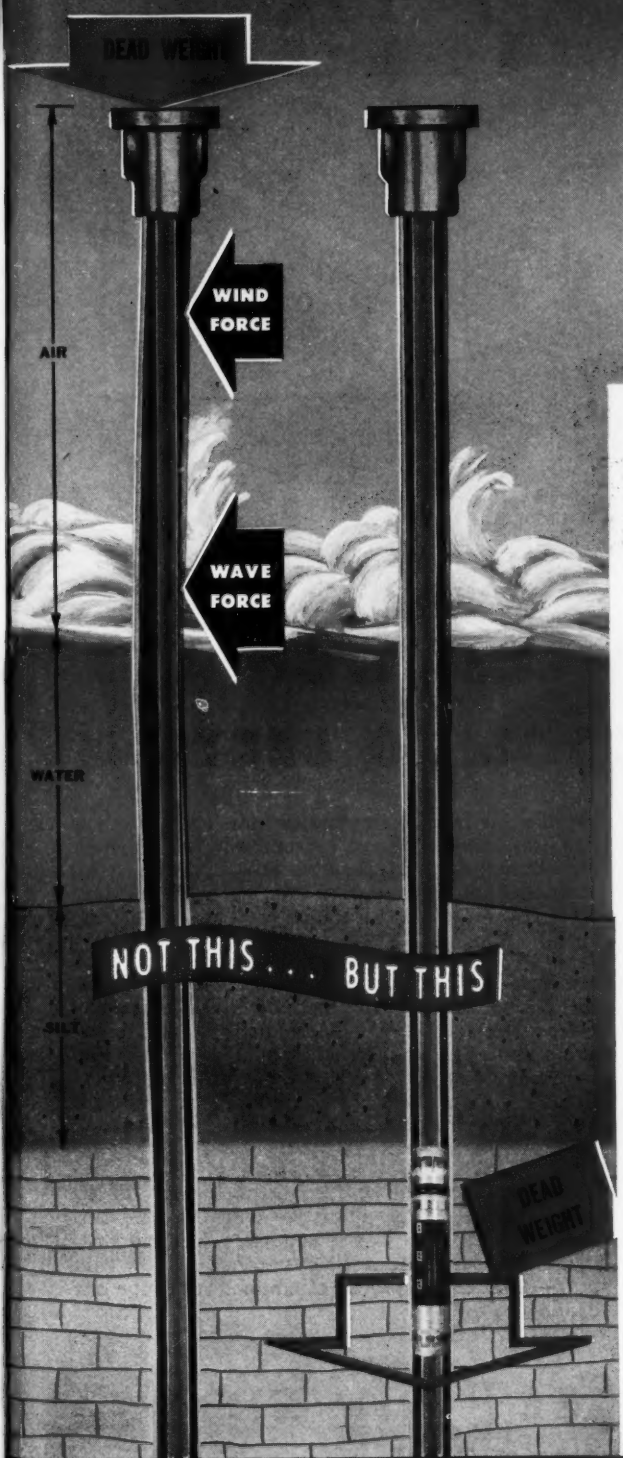
Division of GENERAL PAINT CORPORATION

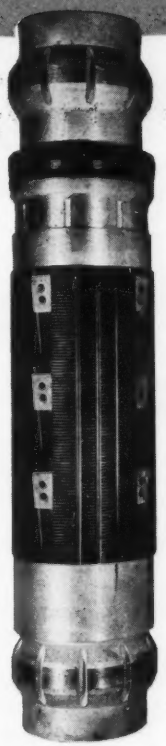
3091 MAYFIELD RD. CLEVELAND, OHIO.

Announcing the new

O C T

TYPE DH-1
CASING HANGER
FOR
SUBSURFACE INSTALLATIONS





O-C-T Engineers, in cooperation with development engineers of a major oil company, have succeeded in designing this revolutionary means of putting casing weight down the hole . . . the oil industry's first off-shore casing hanger.

On off-shore and other water locations, the outer casing string is often ***unsupported*** for many feet with conventional hanger equipment . . . yet this long, slender, unsupported column is called on to support long, heavy, inner strings.

It is an accepted engineering fact that columns of high slenderness ratio ($\frac{l}{r}$) buckle readily under load. A conventional casing head used at the surface of the water puts all the weight of the inner strings on the outer string, which load added to natural forces from waves, wind and corrosion creates a dangerous condition.

The new O-C-T DH-1 Casing Hanger puts the weight on the outer string at a point where solid formation supports it, eliminating the column load and also eliminating the chances of dropping the inner strings in case of accidents to surface equipment.

The O-C-T "Down-the-Hole" Casing Hanger is simple to set. Simply install it in the inner string at the point to be suspended, run it in and cement. After cement has set, adjust tension on inner string, pump between the strings and setting is automatic. ***No rotation is required at any time.***

Write today for complete prices, delivery and setting details on this revolutionary new O-C-T Casing Hanger that eliminates a common hazard in off-shore operations. Available in usual casing size combinations.

NOTE: LICENSED UNDER PATENT RIGHTS OF MAJOR OIL COMPANY.

Oil Center Tool Company

P. O. BOX 3091 — HOUSTON, TEXAS

Export Representatives: Venezuela, Colombia, Peru, and Ecuador: Berry & Hall, Apartado No. 304, Maracaibo, Venezuela.

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XUM

FOR *Economy*

NATIONAL cast iron
CONDENSING and COOLING SECTIONS

Economy of Design—The unique arrangement of internal fins and swirlers in National Sections makes possible higher transfer rates and lower pressure losses, with resulting savings in pumping costs and space requirements.

Economy of Installation—Compact arrangement provides far greater effective surface within a given area of space. This, together with the savings in surface requirements made possible by internal design, means that far less spray pit area or water box size is required. In certain types of installations National Sections require only one-third the space needed for competitive equipment. Support lugs cast integrally with the sections make them self supporting, so no auxiliary bracing is required, installation cost is kept at a minimum.

Economy of Performance—External design provides for unrestricted flow of water as a film from one section to the next, with a minimum of splashing. National Sections require far less cooling water than other types of cascade coolers. When submerged in a box, their smooth exterior surfaces give little opportunity for the collection of foreign matter, so high performance is maintained for longer periods.

Economy of Maintenance—The corrosion resistance of Cast Iron, under many varied and severe conditions, insures long periods between maintenance shutdowns. Units are divided into many component parallel stacks of sections, so that sections can be replaced easily, and with little "downtime." Complete standardization of National Sections means minimum inventory requirement for spare parts.

These economies in your condensing and cooling installations—and many more—can be yours with National Cast Iron Condensing and Cooling Sections. Let one of our field engineers show you how—without obligation, of course. Write for our catalog CP-16.

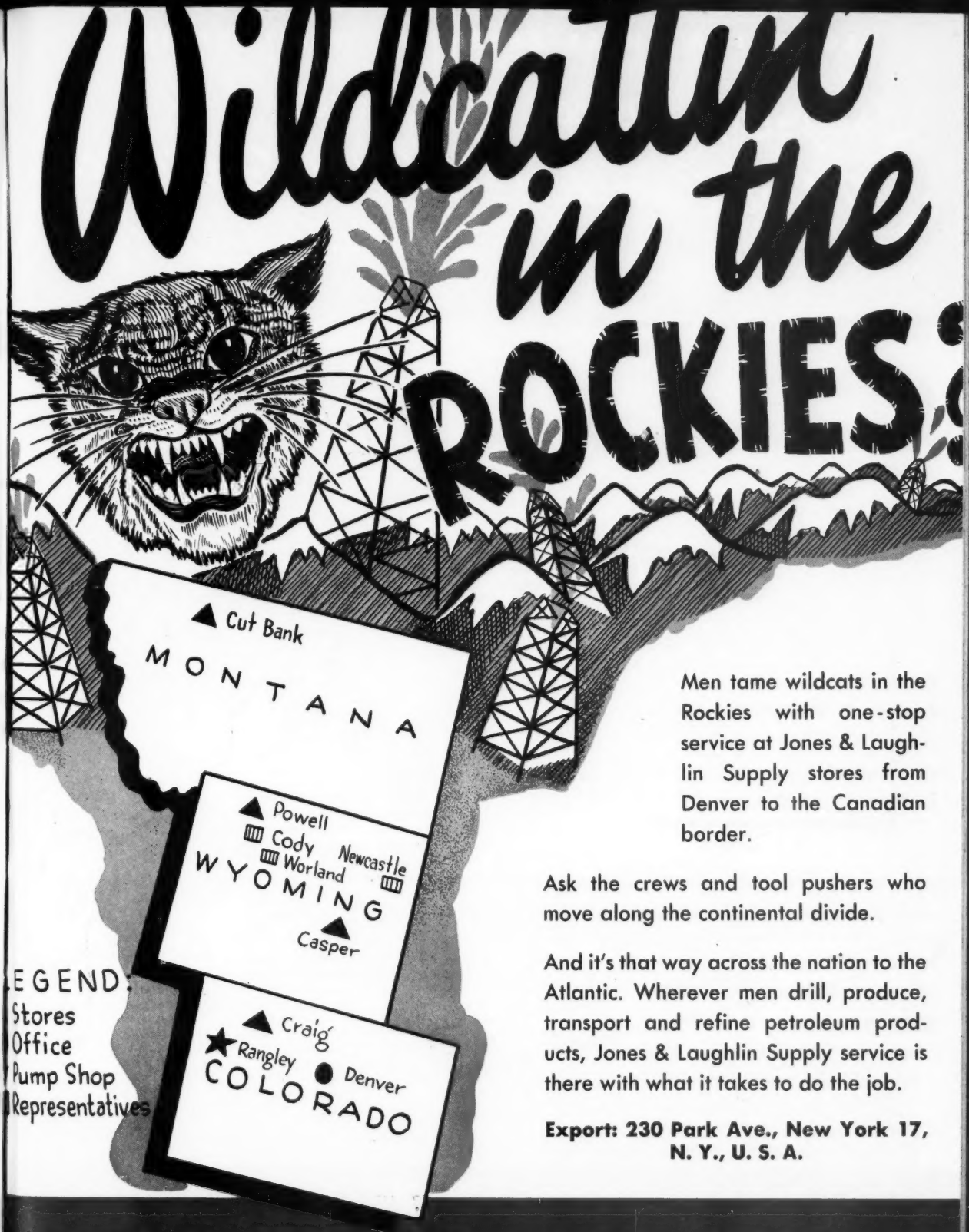
NRC

HEAT TRANSFER DIVISION

THE NATIONAL RADIATOR COMPANY

JOHNSTOWN, PENNSYLVANIA

Wildcat in the ROCKIES!



Men tame wildcats in the Rockies with one-stop service at Jones & Laughlin Supply stores from Denver to the Canadian border.

Ask the crews and tool pushers who move along the continental divide.

And it's that way across the nation to the Atlantic. Wherever men drill, produce, transport and refine petroleum products, Jones & Laughlin Supply service is there with what it takes to do the job.

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Stores and Offices in 17 States

Subsidiary of Jones & Laughlin Steel Corporation

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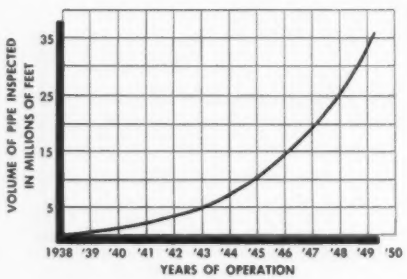
J&L STEEL

IN SELECTING TUBULAR INSPECTION SERVICE,

LOOK FOR THESE ESSENTIAL QUALIFICATIONS:

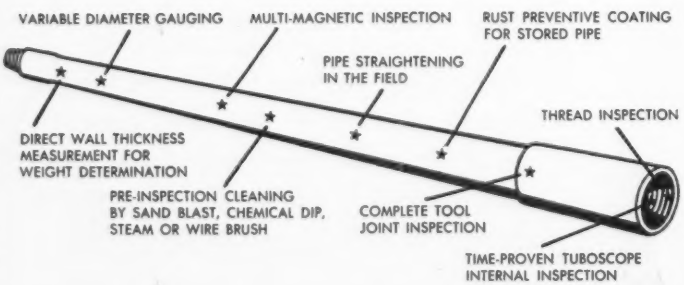
Long-experienced Personnel
Most Complete Technical Facilities
Hemisphere-wide Availability

ONLY Tuboscope OIL FIELD TUBULAR INSPECTION OFFERS ALL THREE!

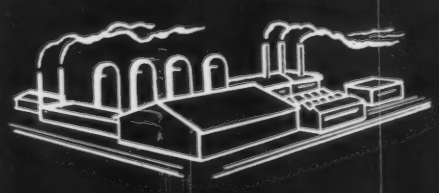


In a business as highly specialized as pipe inspection, experience is of paramount importance to high quality work. Every Tuboscope inspection is backed by 35 million feet of experience!

In bringing laboratory-precision inspection to the oilfields, Tuboscope has not lost sight of the meaning of the word "service". Wherever there is drilling activity . . . from Canada to Colombia . . . there Tuboscope Inspection service is available as an integral part of modern drilling practice.


VARIABLE DIAMETER GAUGING
MULTI-MAGNETIC INSPECTION
RUST PREVENTIVE COATING FOR STORED PIPE
PIPE STRAIGHTENING IN THE FIELD
THREAD INSPECTION
DIRECT WALL THICKNESS MEASUREMENT FOR WEIGHT DETERMINATION
PRE-INSPECTION CLEANING BY SAND BLAST, CHEMICAL DIP, STEAM OR WIRE BRUSH
COMPLETE TOOL JOINT INSPECTION
TIME-PROVEN TUBOSCOPE INTERNAL INSPECTION

In addition, Tuboscope offers a variety of miscellaneous inspection services for core barrels, subs, drill collars, kellys and other drilling equipment. For tool joints designed to be changed in the field, a re-tool jointing service is available in South America and Canada.



Of special value to operators in foreign fields is Tuboscope's New Pipe Inspection Yard in the Pittsburgh area. Here, new pipe can be graded before shipment to distant points.

Tuboscope
DIVISION OF
TUBULAR SERVICE & ENGINEERING CO.
COMMERCE BLDG. HOUSTON, TEXAS

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XUM

COMPLETE

A wild well won't wait. And you can't either, when it comes to getting the necessary equipment to kill the well. Your nearby UNITED store carries a complete line of equipment and supplies, and is always ready to help you in time of trouble. UNITED has 17 stores located at strategic points, with courteous employes anxious and ready to serve you.

Uncle Sandy

THE UNITED SUPPLY MAN

Courtesy
Service
Dependability

UNITED SUPPLY

AND *Manufacturing* COMPANY

TULSA, OKLAHOMA

Stores in Kansas, Oklahoma, Texas, Louisiana, and New Mexico

Perfectly Balanced for FAST, EFFICIENT work

RATIGAN
No. 214
TUBING TONG

Quick-Acting with

MAXIMUM SAFETY!

The Ratigan No. 214 Tubing Tong is new in design and much lighter in weight than previous Ratigan Tongs, yet has greater strength. It is perfectly balanced for fast, efficient work. Ratchet-like action helps to speed up the job of running tubing, and permits easy handling with maximum safety.

The No. 214 is strong and always in position to be put on the tubing. There is no latching or unlatching of any hinged members. The dies are held at the proper angle for taking a positive "sure-grip" instantly, and they can be changed in less than one minute. They simply slip into place and are held firmly in position by a lock nut.

This new tubing tong will take three sizes of jaws—2", 2½" and 3". They are easily and quickly changed by means of a screw-type bolt.

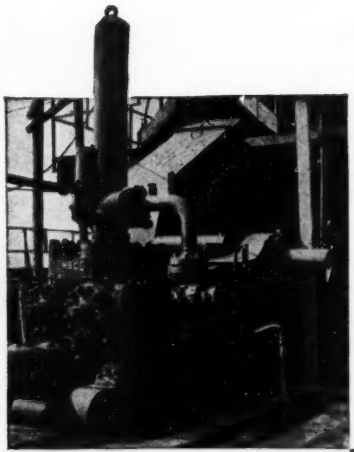
FOR COMPLETE DETAILS ON ALL RATIGAN PRODUCTS, CONSULT YOUR LATEST EDITION OF THE COMPOSITE CATALOG.

Ratigan Products Are Sold Through Leading Supply Stores

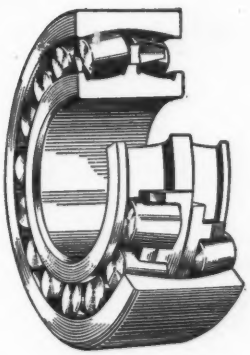
J. P. RATIGAN, Inc.
1213 Santa Fe Avenue
Los Angeles 21, California

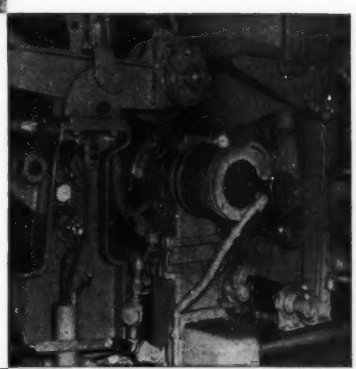
Torrington Spherical Roller Bearings

roll back costs

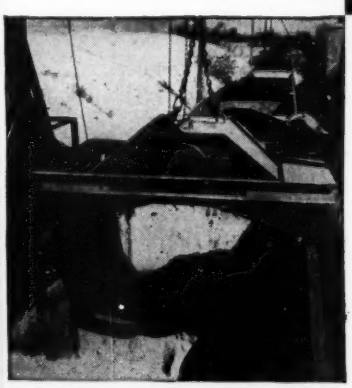


Emsco mounts slush pump main shaft on Torrington Spherical Roller Bearings for dependable day-in, day-out performance on the heaviest drilling schedules.





Beloit gets accurate initial and running alignment of suction press rolls with Spherical Roller Bearings. Maintenance costs go down because bearings need less attention.



Robins Car Shakeout eccentric shafts are mounted on Torrington Spherical Roller Bearings. Power requirements are negligible, thanks to the smooth operation of these self-aligning bearings.

If you measure costs in man-hours, power and production, Torrington Spherical Bearings can roll them back.

Where these self-aligning bearings operate, maintenance crews spend no time making adjustments. Proper rolling alignment is automatically maintained. Even under deflection and misalignment, the bearings run smoothly, so power input is less and service life longer. Replacements are few and far between, downtime reduced, production sustained.

Your heavy-duty machinery, too, can cost less to run and maintain with the advantages of Spherical Roller Bearing operation. Our engineers will bring to your specific friction problems specialized experience gained in every industry. Write us today.

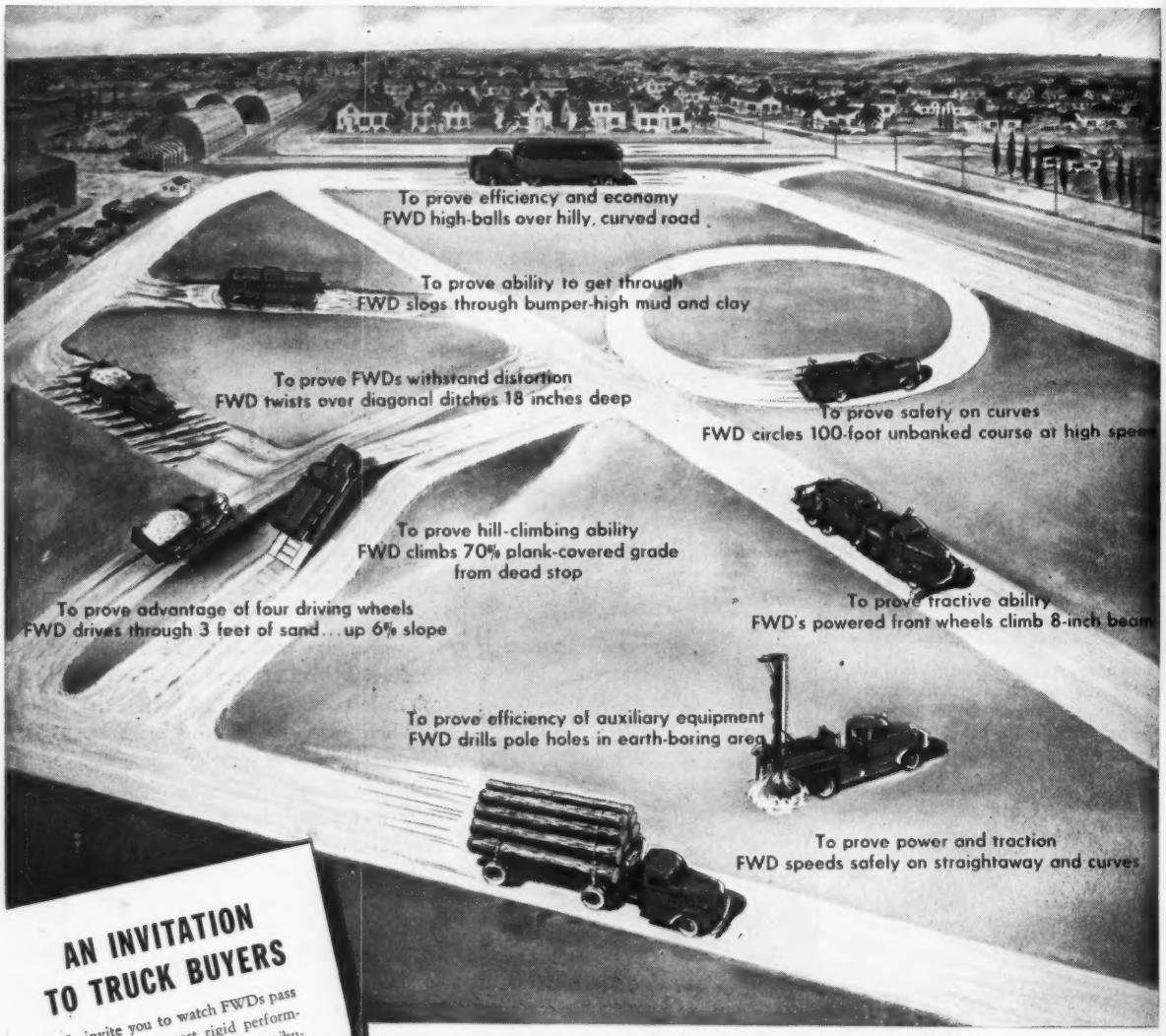
THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.
District Offices and Distributors in Principal Cities

TORRINGTON SPHERICAL ROLLER **BEARINGS**

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers

PROOF - *not Guesswork*

Makes FWD America's Foremost Heavy-Duty Truck


To prove efficiency and economy
FWD high-balls over hilly, curved road
To prove ability to get through
FWD slogs through bumper-high mud and clay
To prove FWDs withstand distortion
FWD twists over diagonal ditches 18 inches deep
To prove safety on curves
FWD circles 100-foot unbanked course at high spee
To prove hill-climbing ability
FWD climbs 70% plank-covered grade
from dead stop
To prove advantage of four driving wheels
FWD drives through 3 feet of sand... up 6% slope
To prove tractive ability
FWD's powered front wheels climb 8-inch beam
To prove efficiency of auxiliary equipment
FWD drills pole holes in earth-boring area
To prove power and traction
FWD speeds safely on straightaway and curves

AN INVITATION TO TRUCK BUYERS

We invite you to watch FWDs pass a series of the most rigid performance tests. Ask your FWD distributor to arrange for you to visit our plant. Or — if you can't get away, ask him to show you the movie, *The FWD Story*. In either case, you will see for yourself how FWD trucks can help solve your heavy-duty trucking problems.

Walter A. Allen
President
The Four Wheel Drive Auto Co.

YOU want to know that your truck can climb steep grades... drive through deep snow, mud or sand... get you through to off-the-road locations. You want to know it can speed heavy loads safely over slippery highways... that it can get you around sharp curves without skidding. You want to know your truck has the stamina to insure long life... that it will do it without expensive mechanical breakdowns.

You can be sure it will if it's an FWD! What's more, with FWDs, you can be sure of these advantages — *even before you buy.* And here's why. On FWD's proving ground, you get proof — *not guesswork* — of what an FWD will do for you. A series of scientifically designed torture tests duplicates every operating condition you're liable to meet. Yes... FWDs prove themselves thoroughly.

Find out what this can mean to you. See your FWD distributor — or write direct for complete facts about FWD Trucks.

THE FOUR WHEEL DRIVE AUTO COMPANY
Clintonville, Wisconsin
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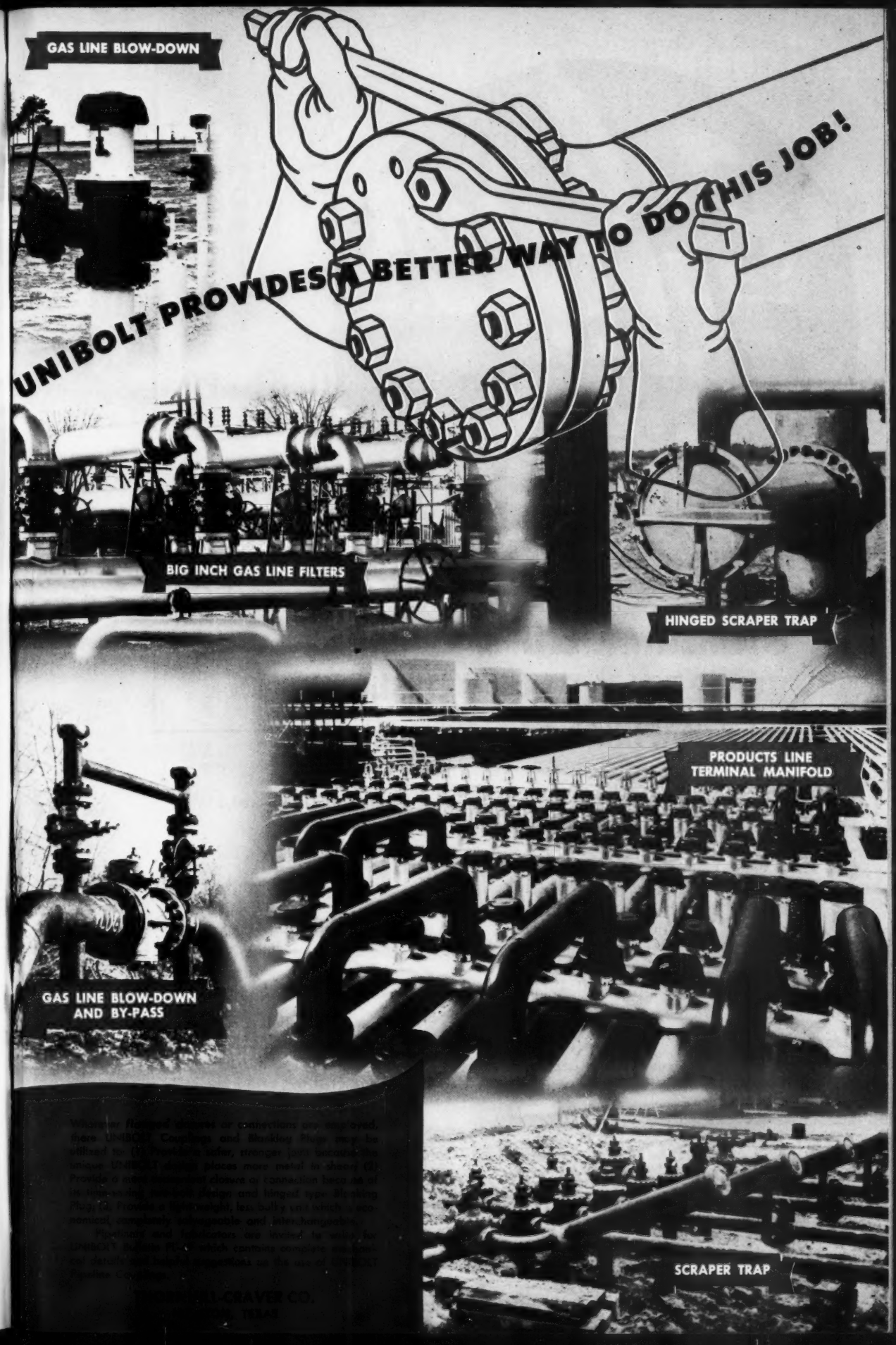
FOUR AND SIX WHEEL DRIVE TRUCKS

FWD

America's Foremost Heavy-Duty Truck


GAS LINE BLOW-DOWN
UNIBOLT PROVIDES A BETTER WAY TO DO THIS JOB!
BIG INCH GAS LINE FILTERS
HINGED SCRAPER TRAP
PRODUCTS LINE TERMINAL MANIFOLD
GAS LINE BLOW-DOWN AND BY-PASS
SCRAPER TRAP

Gilmer BELTS

GILMER MULTIPLE V-BELTS... RUGGEDLY BUILT FOR LONG LIFE IN OIL FIELD SERVICE

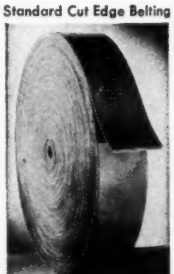
Gilmer Multiple V-Belts give you many "extras" to assure dependable performance in oil field service: —special non-slip grip, evenly matched lengths, controlled stretch, sturdy structure. Special constructions to withstand conditions of excessive oil, heat and static. Gilmer V-Belts bring you extra dividends in pulling power, long life and economy.

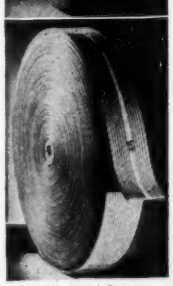
Whatever your V-Belt needs, Gilmer can fit them exactly, for there are Gilmer Multiple V-Belts, standard or special, endless and connected, for every type of drive.

Also, a complete line of flat belts manufactured by Gilmer includes the famous Kable Kord "2 belts in one" . . . contactor and power . . . as well as cut edge belts. The Endless type consists of continuous cord construction that reduces stretch practically to zero.

Whatever your power belt needs, Gilmer has the *right belt* to fit them. Gilmer engineers will be glad to help with any of your belting problems.

Standard Cut Edge Belting





Kable Kord Belting

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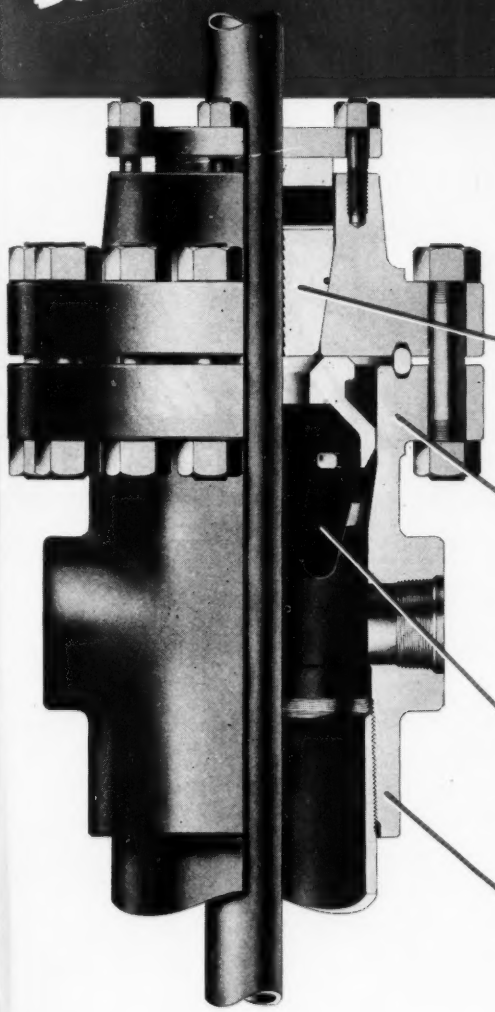
Write now for your FREE copy of the Gilmer Guide. It contains engineering data that will help you get maximum service from your V-Belt drives.

The New CAMERON Low Pressure Tubing Head

Highest "Quality" Lowest "Cost"

$96.00

Size 6", Series 400, Less Stripper



★ SLIP SUSPENSION AND SEAL

Slip suspension of tubing, with a dependable bolted gland type stuffing box. Also available at an even lower price, with bonnet threaded male by female for supension of tubing.

★ API SERIES 400 OR 600 FLANGE

The only low cost head with a standard API integrally flanged top connection. A flanged valve or other control unit may be readily installed on this head without resorting to an adapter.

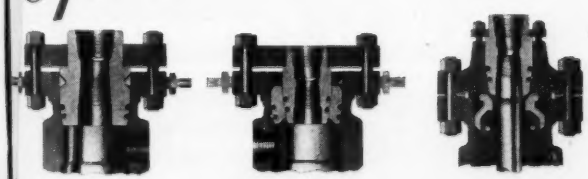
★ TUBING STRIPPER

An efficient Hycar Stripper Rubber (optional) which is interchangeable in this and all types of Cameron Forged Steel Tubing Heads.

★ CAMERON FORGED STEEL

. . . from top to bottom. A product of the oil tool industry's largest and most modern forge shops.

Optional Hangers



TYPE BC TYPE BCB TYPE BCQ

Cameron
IRON WORKS, INC.
P. O. BOX 1212 HOUSTON, TEXAS

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74 Trinity Place New York, N. Y.

HERE'S NEW AND GREATER

Protection!

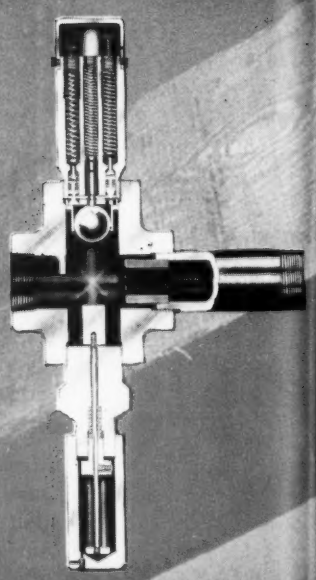
AGAINST

- EXCESSIVE PRESSURES . .
- FLOW LINE BREAKAGE . .
- STORM AND HURRICANE . .

FOR ALL PRODUCING WELLS

W-K-M Automatic SHUT-OFF VALVE

(Meynig Pattern—Patents Pending)



Automatically closing against any predetermined high or low pressure, the W-K-M Shut-Off Valve is a double-acting safety valve that reduces damage, danger and loss caused by flow line breakage to an absolute minimum; it protects flow lines and separators against excessive pressures; it further permits all wells flowing into one separation point to be closed simultaneously simply by closing one central control valve at the point of separation.

Designed originally for use on marine wells to provide safety and protection in event of line breakage caused by high pressure, dragging anchors, storms and hurricanes, the valve has proved highly successful on all producing wells . . . flowing, pumping or gas lift . . . whether they're on land or water. It is of especial value in areas where paraffin or ice threaten flow lines.

Light weight, low cost, easily installed on any well, the valve has opening and closing pressure ranges from 5 to 3000 p.s.i., to cover practically every producing condition.

For complete information, write for Bulletin No. 693.

W-K-M Company, Inc

OIL FIELD, PIPE LINE & INDUSTRIAL EQUIPMENT

HOUSTON, TEXAS, U. S. A.
LOS ANGELES

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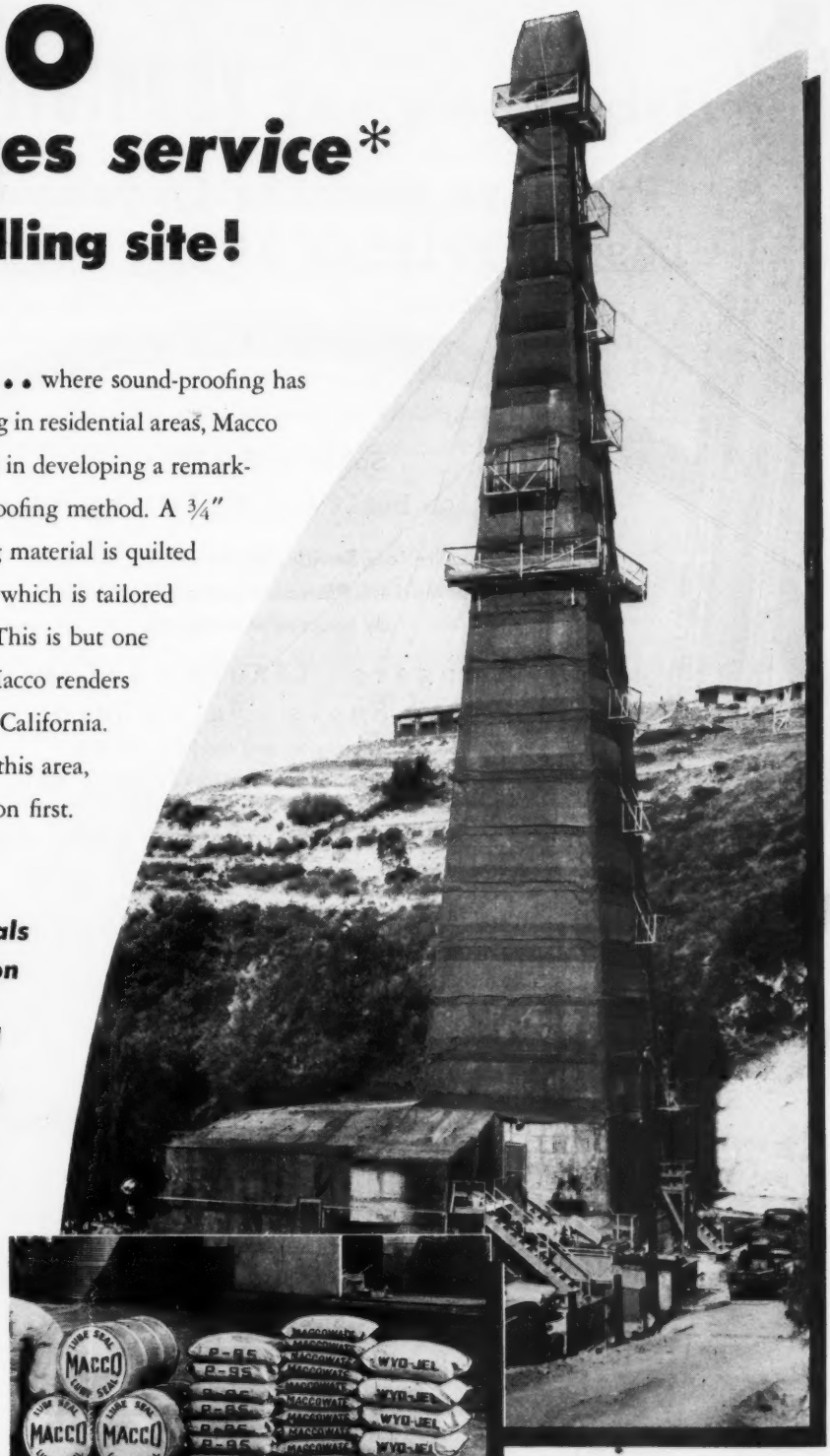
York, N

MACCO

packages *service** to the drilling site!

In California . . . where sound-proofing has become a "must" for drilling in residential areas, Macco oil field personnel assisted in developing a remarkably successful sound-proofing method. A ¾" thickness of sound-proofing material is quilted between flame resistant canvas which is tailored to fit the derrick and houses. This is but one of the many services that Macco renders the oil producing industry in California. On your next drilling job in this area, consult Macco Corporation first.



* ***Derrick Rentals and Erection***

* ***Sound-Proofing***

* ***General Oil Field Construction***

* ***Drilling Fluid Engineering Service***

Objectionable noise was reduced 85% on this job.

1-1

MACCO CORPORATION

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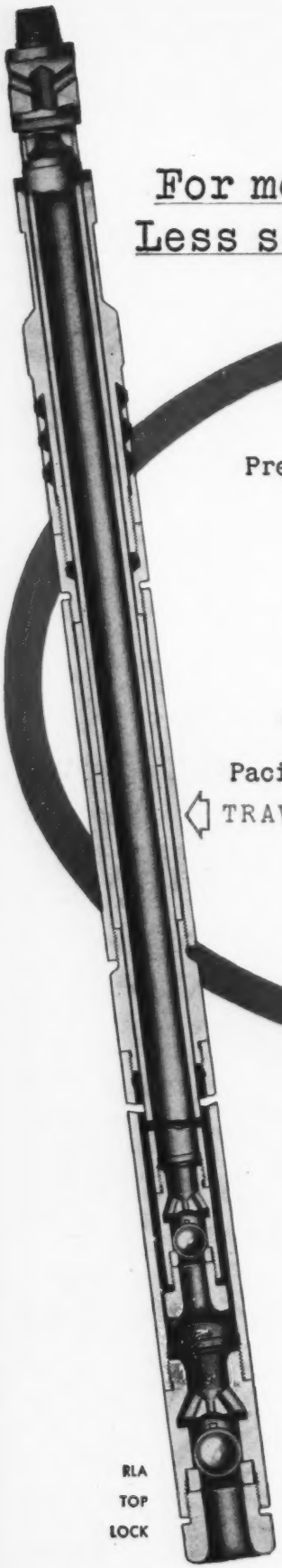
Branch Plants: BAKERSFIELD • ROSAMOND • HURON • RIO VISTA • VENTURA

For more service in your well...
Less servicing at the surface!



Specify Pacific
Precision Built Oil Well Plunger Pumps

Require Less Servicing at the Surface Because
of Maximum Protection for the Critical Zone
By Selecting Materials for

Plungers · Liners · Valves
Valve Seats · Valve Cages

To resist corrosion and finished with the
hardness necessary TO RESIST ABRASION AND WEAR.

Pacific Oil States Sectional Liner Pumps

TRAVELING PLUNGER TYPE

TRAVELING BARREL TYPE

Built to API Standards
with Pacific Precision Finish

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Precision Built
PUMPS

Pacific Pumps Inc.
One of the Dresser Industries
HUNTINGTON PARK, CALIF.
Mid Continent Division
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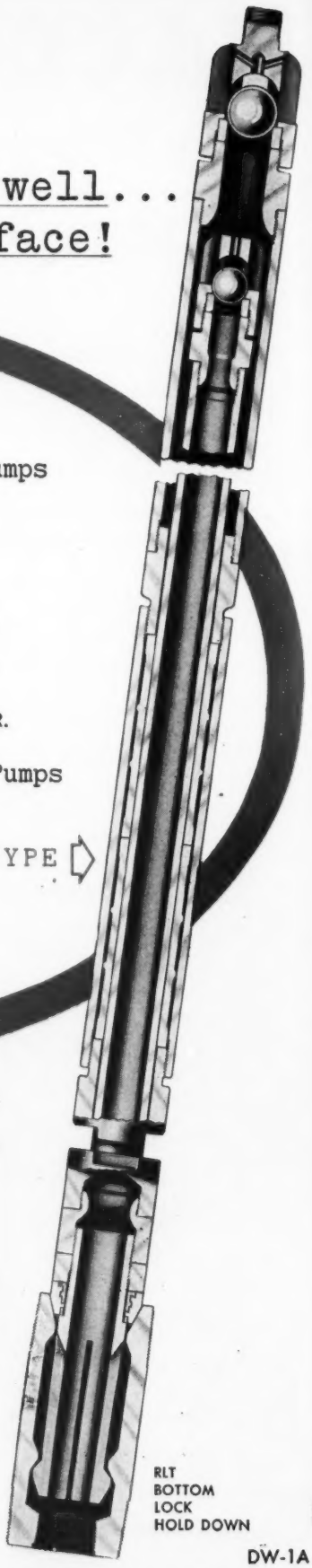
Export Office: Channin Bldg., 122 E. 42nd St.
New York, N. Y.
Offices in All Principal Cities



RLA
TOP
LOCK

RLT
BOTTOM
LOCK
HOLD DOWN

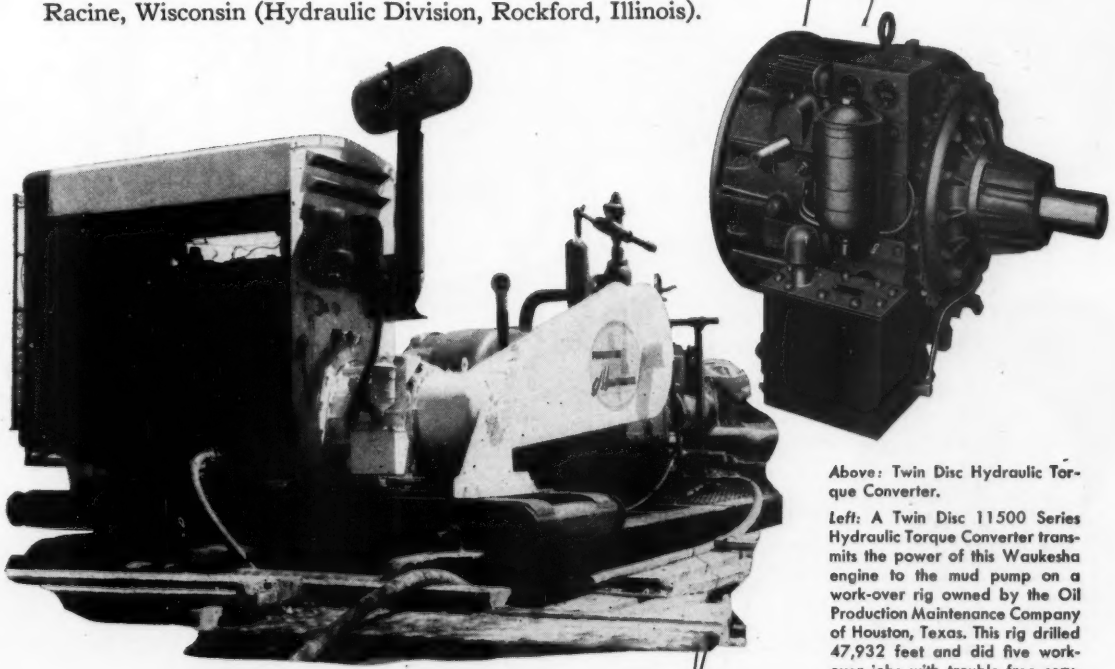
DW-1A

High Efficiency for pump drives

Twin Disc Torque Converters on pump drives allow your engine to operate at its most efficient speed while the pump automatically runs at the maximum speed consistent with the pressure required in pumping.

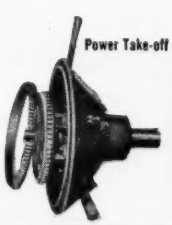
The application of a clutch-type Twin Disc Hydraulic Torque Converter also will permit the engine to be disconnected from the pump during idling periods . . . *will eliminate the need for "speed packages" to meet changing requirements in volume and pressures as the hole deepens* . . . dampen shocks and torsional vibrations effectively.

Twin Disc Hydraulic Torque Converters (Lysholm-Smith type) have been successfully applied to various sizes of heavy-duty drilling rigs, slush pumps, cementing pumps, special purpose pumps, coring reels, sand line reels, independent rotary table drive units and other specialized applications. Write the Hydraulic Division for your copy of Converter Bulletin 135-C. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



Above: Twin Disc Hydraulic Torque Converter.

Left: A Twin Disc 11500 Series Hydraulic Torque Converter transmits the power of this Waukesha engine to the mud pump on a work-over rig owned by the Oil Production Maintenance Company of Houston, Texas. This rig drilled 47,932 feet and did five work-over jobs with trouble-free service from the Converter.



TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U.S. PAT. OFF.

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

BLACK MAGIC

OIL BASE DRILLING FLUID

can be maintained

"HEAVIER" or "LIGHTER"

than any drilling mud

in use today

FREQUENTLY during drilling operations it becomes necessary to use muds at very high and very low weights. Black Magic is the ideal drilling fluid in any emergency. It can be weighted up to 21#/gal. (157#/cu. ft.) by adding Chemical X and ordinary commercial barytes; or can be diluted down to 7.5#/gal. (56#/cu. ft.) by adding OB Zero and mixing oil; yet will still retain its excellent plastering properties and stability. With Black Magic you can get a highly efficient drilling mud that is considerably lighter than water. In addition, Black Magic has a filtrate loss of zero and is especially recommended for drilling through hydrous disintegrating shales. It is unaffected by anhydrites, gypsum, limestone, cement and most mud-contaminating formations, and can be regenerated for use over and over again.

For complete information on Black Magic, White Magic, Chemical X and OB Zero, contact your nearest Oil Base, Inc. office or write

OIL BASE, INC.

130 ORIS STREET, COMPTON, CALIFORNIA

BRANCH OFFICES: Houston, Oklahoma City, Midland, Walters, Casper, Bakersfield, Long Beach, Ventura.

EXPORT: Petro-Tech Service Co., Caracas, Maracaibo, VENEZULA; Elmer R. Smith, Caracas; G. Saavedra E. Hijos, S. de R.L., MEXICO, D.F.

Extra-heavy mud is wanted when there is danger of excessive gas pressure. It is also used to hold back salt water under pressure, to keep the well "static," and to restrain the flow of oil while drilling. "Feather-weight" mud is necessary to combat lost circulation. With the addition of Chemical X or OB Zero to Black Magic, this drilling fluid can be maintained heavier or lighter than any other known mud.

HEAVIER

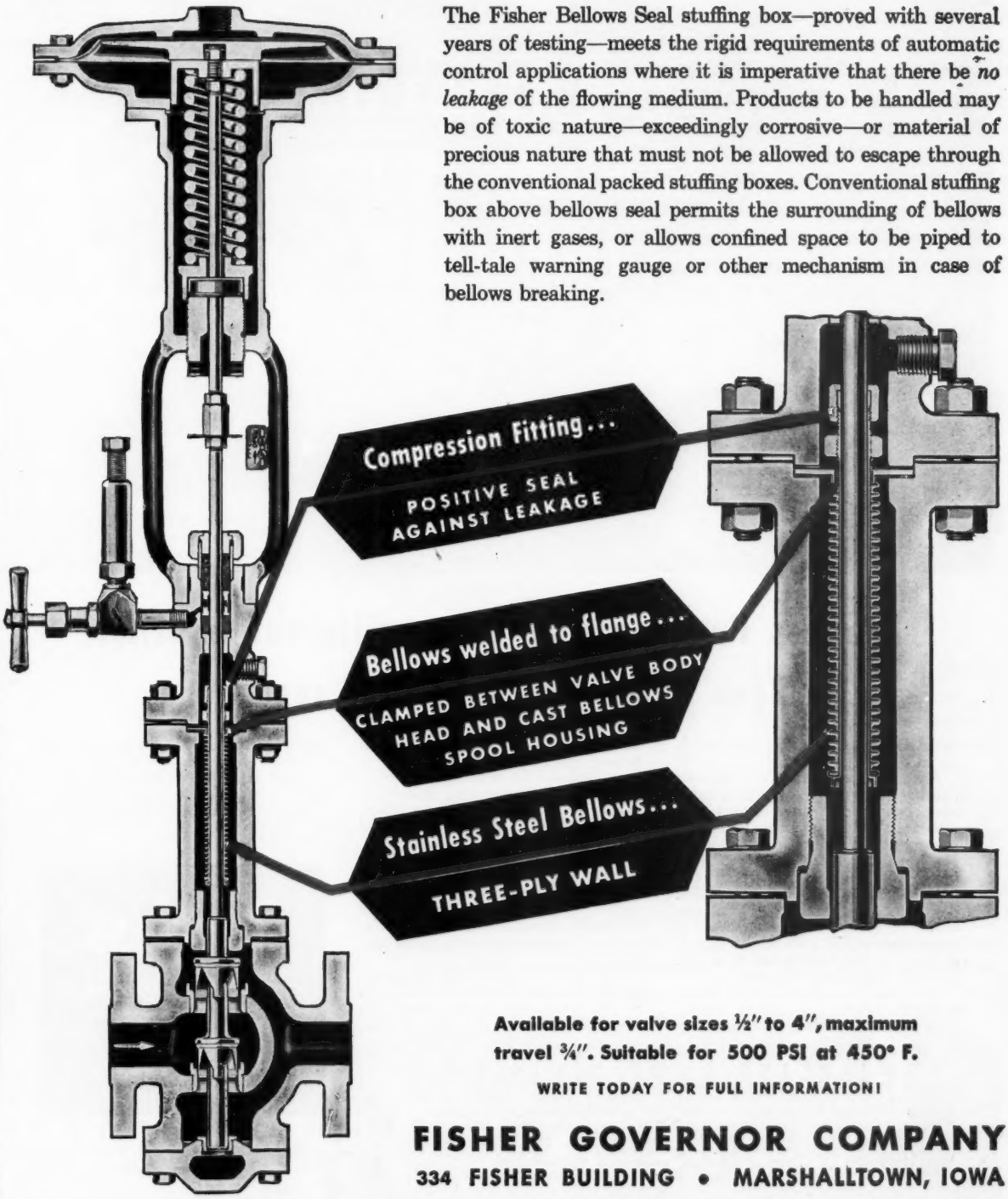
Use Chemical X in combination with "Heavy" Black Magic to obtain very high weighted mud. Chemical X keeps Black Magic in a fluid state by lowering the viscosity and enables more weight material to be added than is normally possible. With Chemical X, Black Magic can be weighted as high as 21#/gal. (157#/cu. ft.).

LIGHTER

Use OB Zero to increase the viscosity of "Light" Black Magic or Black Magic Premix and then add diesel oil to dilute the mud until the weight and viscosity are suitable. By this means a drilling fluid with desirable properties and yet a weight of only 7.5#/gal. or 56#/cu. ft. (approaching specific gravity of diesel oil) can be easily made.

SEALED

The Fisher Bellows Seal stuffing box—proved with several years of testing—meets the rigid requirements of automatic control applications where it is imperative that there be *no leakage* of the flowing medium. Products to be handled may be of toxic nature—exceedingly corrosive—or material of precious nature that must not be allowed to escape through the conventional packed stuffing boxes. Conventional stuffing box above bellows seal permits the surrounding of bellows with inert gases, or allows confined space to be piped to tell-tale warning gauge or other mechanism in case of bellows breaking.


Compression Fitting...
POSITIVE SEAL AGAINST LEAKAGE
Bellows welded to flange...
CLAMPED BETWEEN VALVE BODY HEAD AND CAST BELLOWS SPOOL HOUSING
Stainless Steel Bellows...
THREE-PLY WALL

Available for valve sizes ½" to 4", maximum travel ¾". Suitable for 500 PSI at 450° F.

WRITE TODAY FOR FULL INFORMATION!

FISHER GOVERNOR COMPANY

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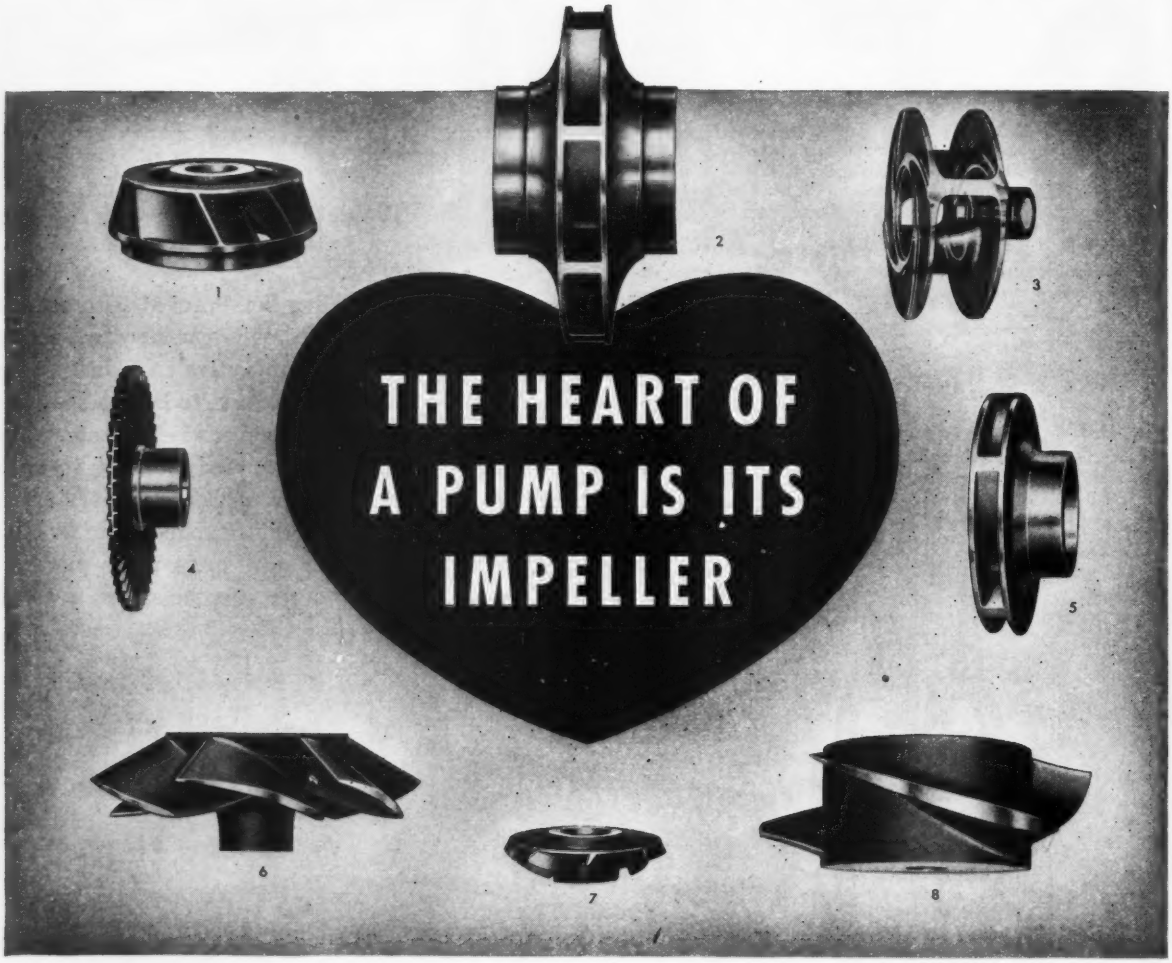

Peerless Pumps utilize many different impeller designs to meet various fluid conditions

What makes a pump "tick?" Its heart is an impeller!

Pictured above are eight Peerless impeller designs for varying fluid conditions. No. 1 forces water upward from deep wells. No. 2 is a double suction design for high capacity horizontal pumps. No. 3 pumps solids in suspension. No. 4 handles all liquids in small capacities, at high heads. No. 5 is of single suction design for process services. No. 6 combines both radial and axial flow. No. 7 is a semi-open impeller for small diameter deep wells. No. 8 is an impeller that "propels" large liquid volumes.

The point is—capacities, lifts, heads, temperatures, chemical analysis, clarity, shaft speeds are seldom common to different pump services and installations. Because fluid conditions vary, Peerless pump designers are versatile and Peerless pumps utilize this versatility in different impellers for varying fluid conditions, successfully pumping most liquids in all industries.

Peerless horizontal pumps are available for general purpose pumping, for handling sewage and other materials in suspension, for most all process services, for moving chemicals and oils, for acids and caustics and for such specialized applications as l-p gases.

Peerless vertical turbine pumps are available for lifting water from deep wells or close-coupled for wet or dry pit installation and for drainage, drydock, canal diversion and flood control services.

Plan with Peerless for all your needs for pumps. Individual descriptive Bulletins on each of the types of Peerless Pumps described above are available upon request.

Peerless
VERTICAL AND HORIZONTAL
Pumps

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Los Angeles 31, California Indianapolis, Indiana
District Offices: New York 5, 37 Wall Street; Chicago 40, 4554 N. Broadway; *Atlanta Office:* Rutland Building, Decatur, Georgia; Omaha, Nebraska, 4330 Leavenworth Street; Dallas 1, Texas; Fresno, California; Los Angeles 31, California

Resistance to corrosion . . . resistance to heat . . . high strength . . . freedom from maintenance troubles . . . these are but some of the reasons why ELECTRUNITE Tubing and Pipe—made of Republic ENDURO Stainless Steel—are widely used in petroleum processing operations.

As produced by Republic's *improved* electric welding methods, these modern tubular products are uniformly ductile, strong, sound and round . . . free from scale and scale pits both inside and out. Wherever corrosive or high temperature conditions are encountered, they afford inexpensive protection against costly "off-stream" interruptions.

ELECTRUNITE Stainless Steel Tubing and Pipe are available in a wide range of analyses, gages and sizes. For complete information, write today for a free copy of Republic's informative 28-page fabricating guide.

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REPUBLIC STEEL
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ELECTRUNITE
STAINLESS STEEL TUBING

KAYDON ANGULAR THRUST BEARINGS—USED ON ROTARY TABLES OF OIL DRILLING RIGS

CONTACTING KAYDON was the RIGHT IDEA for IDECO*

*International Derrick & Equipment Co. — One of the Dresser Industries

No manufacturer of heavy-duty machinery can afford to compromise on bearings, the very heart of efficient operation... particularly in powerful oil field rotary tables where the tremendous loads demand super-rugged, high precision bearings.

IDECO is one of many of America's outstanding machinery builders who find **KAYDON** Bearings are right! On the 14½" IDECO Rotary Table for Drilling Rigs 22.750" OD bearings are used . . . the 17¼" IDECO Streamlined Rotaries use bearings 29.250" OD . . . the 23", 36.000" OD bearings... the 27½", 39.625" OD bearings . . . big, rugged, but smooth and reliable in performance as a fine watch movement!

Other heavy machinery engineers also find it's the right idea to "Contact **KAYDON**" for bearings that more than meet the demands of steel mill and paper mill machinery, excavators, loaders, cranes, hoists, crushers, food processing and all types of heavy-duty equipment.

KAYDON *Types of Standard or Special Bearings:*

Spherical Roller
Taper Roller
Ball Radial
Ball Thrust
Roller Radial
Roller Thrust

Counsel in confidence with **KAYDON**. Capacity now available for all sizes and types of **KAYDON** Bearings.

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

All types of Ball and Roller Bearings 4" bore to 120" outside diameter

GEORGE FAILING'S SMART IDEA!

He invents a portable "divining rod" that helps bring in thousands of oil gushers all over the world!

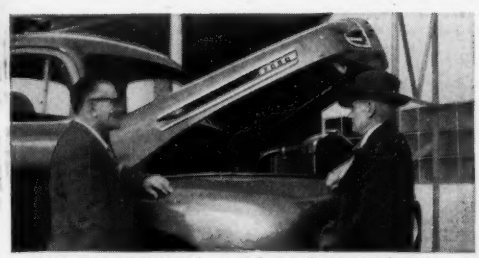
TWO OIL EXPLORATION METHODS now widely used were made more practical by George Failing's revolutionary idea. In one method of exploration, an earth-drill picks up samples (cores) from different strata for study by geologists. In another, dynamite charges are set off in a hole, and the effects are studied by seismograph. With either method, fast, low-cost drilling is a "must." That's what Failing gave oil men in 1931 with the portable drill he mounted on an old Ford Pickup Truck. With this he could set up and drill as many as 12 holes in a day. Former drills required a week for setup alone.

GEORGE FAILING with seismograph expert, Ray Welch of the Seismograph Service Corp. The seismograph records data on the effects of the underground explosion. Welch interprets this data to locate underground traps for oil or gas.

THERE SHE GOES! A charge of dynamite is set off in a hole drilled by Failing equipment mounted on a Ford Truck. George Failing's idea has become a multimillion-dollar business for Enid, Oklahoma.

GEORGE FAILING'S SMART MOVE!

He uses 5 Ford Bonus Built Trucks in his own business, has equipped thousands of others with drills!



"OIL FIELD GUMBO is a real test for a truck," Jess Page, (right) the Ford Dealer's service manager tells George Failing. "And this 145-h.p. V-8, biggest Ford Truck engine ever built, has power to pull you through and to keep the drills running steadily."

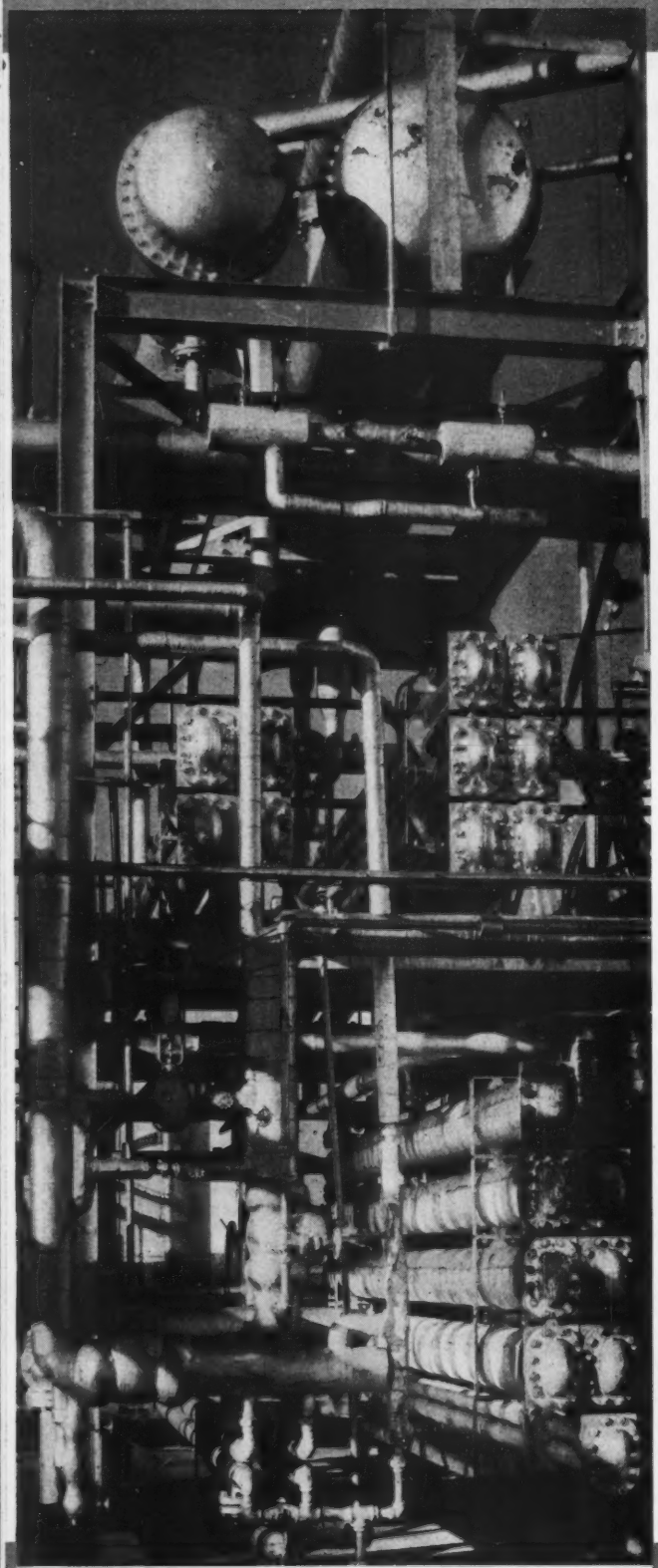
"THIS FEATURE IS A KNOCKOUT. The brake drums are not one piece with the hubs. They're separate, and removable. This simplifies brake maintenance, and cuts replacement costs because you don't have to buy a wheel when you want a brake drum only."

"HERE'S MY LATEST drill mounted on a new Ford F-7 Big Job," George Failing remarks to Ford Dealer L. A. Neal. "If it works as long as my original 1932 model Ford, it'll still be going strong in 1966." Replies Neal, "Ford Trucks are built extra strong to last longer, Mr. Failing. They're built to take it. There are over 139 Ford Truck models, every one Bonus Built with big strength reserves."

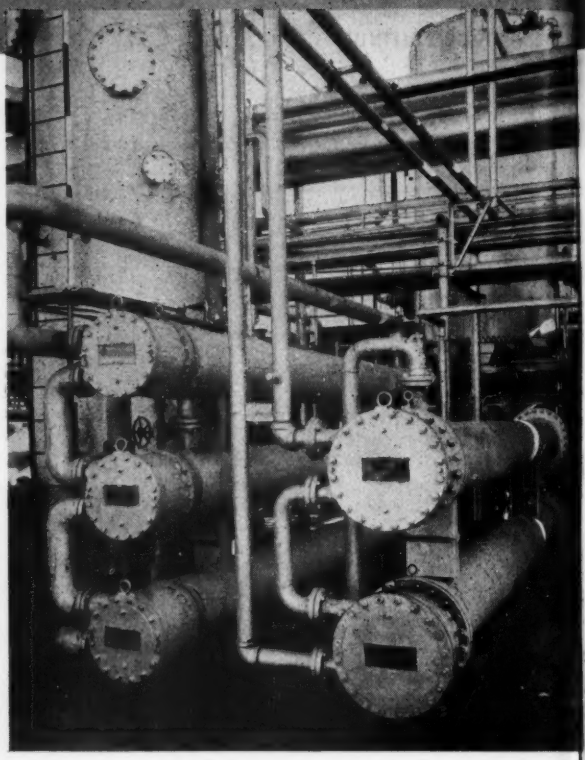
GEORGE FAILING'S SMART BET!

FORD TRUCKS LAST LONGER!

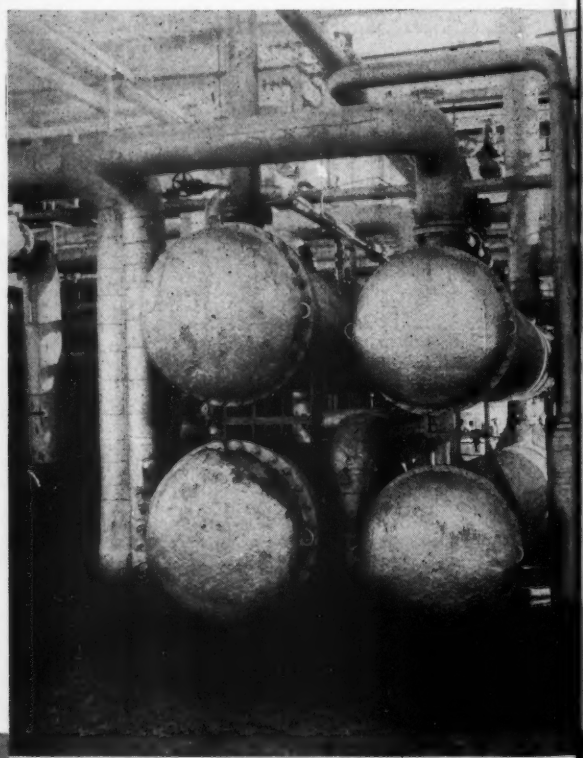
Using latest registration data on 5,444,000 trucks, life insurance experts prove Ford Trucks last longer!



G-R Twin G-Fin Sections and Vapor-to-Feed Heat Exchangers



At left, G-R Heat Exchangers, and at right, G-R Gas Cooler



G-R Residue-to-Crude Heat Exchangers

GRISCOM-RUSSELL — PIONEERS IN HEAT TRANSFER APPARATUS

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XUM

G-R EQUIPMENT

Helps This Cosden Refinery Operate with Sour Crude

The Big Spring, Texas, plant of Cosden Petroleum Corporation must contend with exceptional operating and maintenance problems because of the sour crude which this plant has always refined. However, the engineers and technologists of the plant have successfully solved these problems by the special treatment of the crude which they have developed and by their selection of equipment and materials to withstand the severe corrosion conditions throughout the plant.

As in many other Cosden installations, G-R Heat Transfer Apparatus is helping this plant to operate successfully and efficiently. The G-R equipment installed here includes:

Tubular Residue-to-Crude Exchangers
Tubular Gas Coolers
Twin G-Fin Section Vapor-to-Feed Exchangers
Tar-Heated Steam Generator

Whether your own needs for heat transfer apparatus are for standard or special equipment, be sure to confer with the Griscom-Russell engineers. Their recommendations are *authoritative:* with 80 years of specialized experience . . . *impartial:* with the unequalled line of G-R bare-tube and finned-tube condensers, heaters, coolers and heat exchangers to provide an exactly suitable design for every service . . . *conservative:* with ratings that can be guaranteed.

THE GRISCOM-RUSSELL CO.
285 MADISON AVENUE, NEW YORK 17, N. Y.

GR-219

GRISCOM-RUSSELL

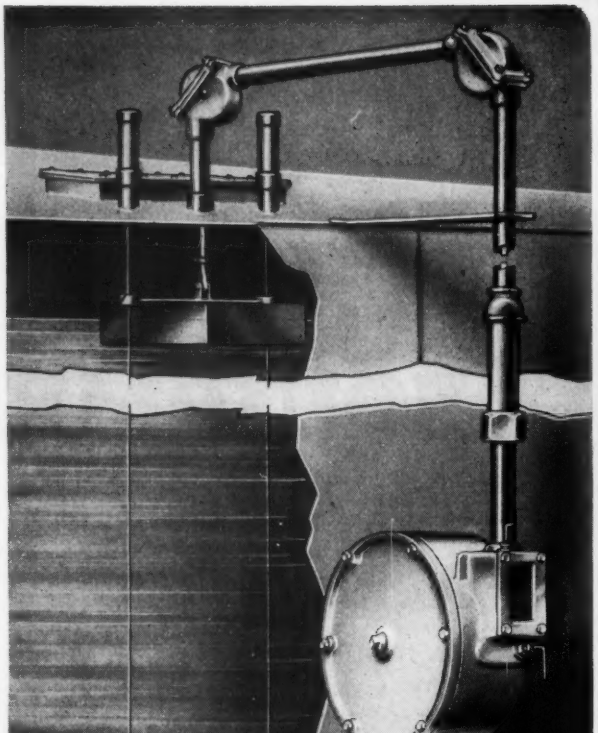
Equip Your Tanks WITH AUTOMATIC GAUGES

Gauging Petroleum Storage Tanks automatically has become such standard practice on all new installations of refinery and bulk storage tanks that one is likely to jump to the conclusion that this is the only way gauging is being done.

We know, of course, that there are thousands of storage tanks in all parts of the world, where men still have to climb to the tank top, open a gauge hole cover, lower a graduated steel tape and record the reading in an inventory book.

That method is slow, dangerous, expensive, and far less accurate than automatic gauging, in which the gauger merely takes a reading of the tape at ground level—eliminating the dangers of climbing ladders in all kinds of weather, damage to tank tops, personal hazards of asphixiation.

We manufacture a complete line of automatic tank gauges which are applicable to practically every type of storage tank used in the petroleum industry, so no matter how ancient the vintage of your tanks, no matter what type of roof—we can supply you with an automatic tank gauge.



Shown above is our automatic tank gauge No. ST-2935, adaptable to cone, dome, water top, cylindrical and other types of tank roofs. We also manufacture electric remote reading gauges which are the last word in accuracy and speed and SAFETY.

SHAND & JURS CO.
BERKELEY, CALIFORNIA

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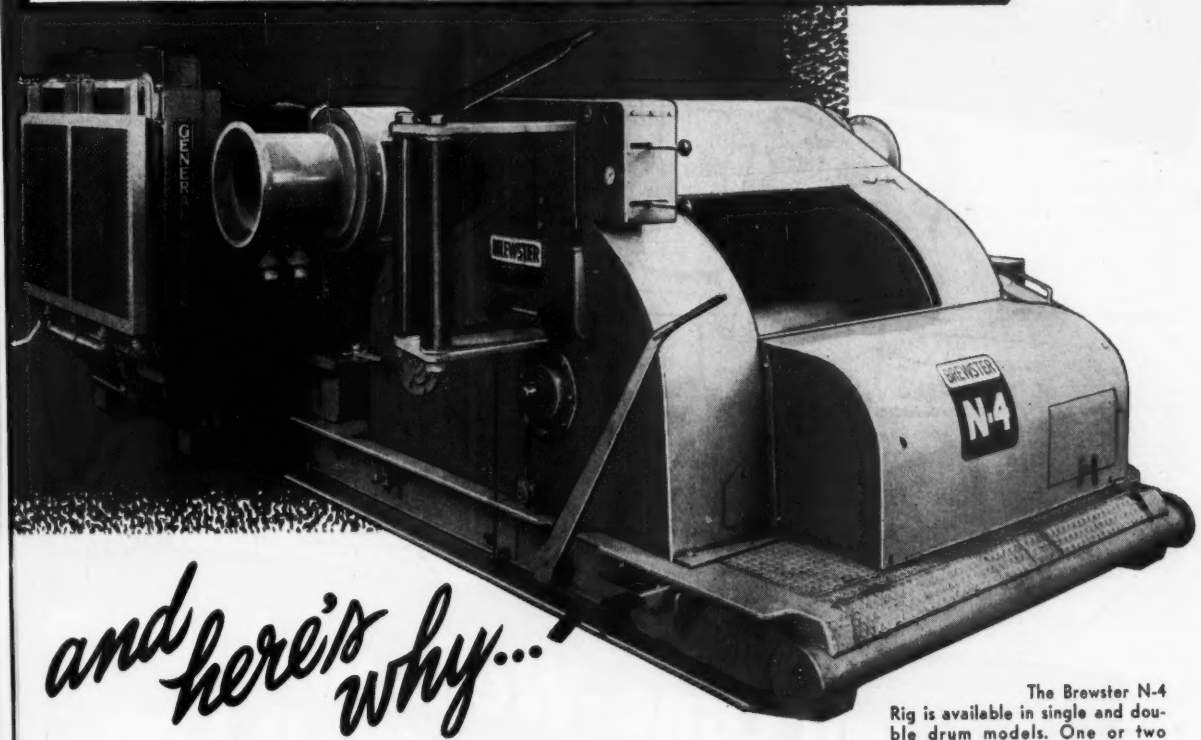
THE BREWSTER N-4 HAS THE PORTABILITY AND FLEXIBLE POWER TO CUT YOUR DRILLING COSTS IN 3500' TO 5500' PROGRAMS



and here's why...

The Brewster N-4 Rig is available in single and double drum models. One or two engines.

The Brewster N-4 Drawworks offers

EXTREME PORTABILITY—Compact design,-low overall dimensions, and single skid base allow the N-4 to be easily moved in one load.

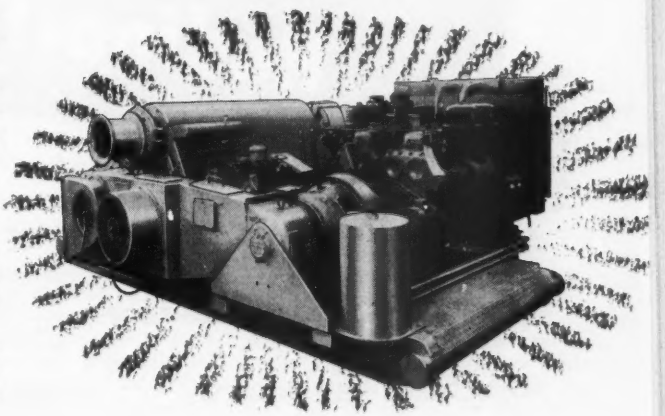
FLEXIBLE POWER FLOW—The N-4 Rig is entirely air-controlled. The Torque Converter automatically supplies maximum engine power with minimum engine effort and protects engine from stall and overloads.

HYDROMATIC BRAKE—(furnished as optional equipment)—provides smooth, safe, even braking. Wear of brake and other equipment is greatly reduced.

FIELD PROVEN PERFORMANCE—Brewster N-4's have established a reputation for stamina and durability in U. S. and Canadian fields. Contractors' records prove them highly profitable for drilling from 3500' to 5500'.

BREWSTER MATCHED EQUIPMENT—The N-4 Team—The RS-18 Rotary, the 4-S Swivel, the H-100 Block, and the N-4 Drawworks—offers the maximum in engineered drilling efficiency and economy.

FAST FIELD SERVICE—The N-4 Rig, like any Brewster Rig, has the benefit of 24-hour field service anywhere in the U.S. A telephone call brings repair parts or an experienced service man immediately.



The BREWSTER Co., Inc., Shreveport, La.

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24-HOUR BREWSTER SERVICE

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MURRAY BROOKS, INC.
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BREWSTER MATCHED *Drilling Equipment*

XUM

"I can't see through the casing

. . . call Lane-Wells and run a Radioactivity Well Log"

Lane-Wells Radioactivity Well Logging

"sees" through casing and cement to reveal character and thickness of all formations, show porous zones, find possible cased-off pay zones, detect fluid-bearing zones, locate casing seats, and liner overlaps make measure checks, check on all squeeze jobs, and tie all information to fixed immovable reference points – the casing collars

A COMPLETE PICTURE OF YOUR WELL

LANE WELLS

TECHNICAL OILFIELD SERVICES

LOS ANGELES – HOUSTON – OKLAHOMA CITY

Radioactivity Well Logging

..gives the Only Complete Record possible through Casing!

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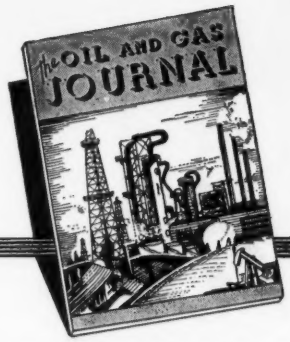

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JOURNALLY Speaking

Yellow Beats Red

YOU don't need to study Russian to keep up with developments in the field of petroleum chemistry. You can do it much easier by reading a certain yellow-covered, weekly oil publication printed in Oklahoma for $3 a year.

That's the considered conclusion of a couple of Northeastern University professors who have been studying the problem most seriously for a long time.

How the Russians ever got in there in the first place is a mystery to us. We never even felt the competition. Part of the Reds' undercover infiltration tactics, no doubt. But now they are pulling out, in keeping with the Soviet policy of noncooperation with the Western World.

Anyway, these professors report that a Russian publication by the name of "Neftyanoe Khoz" ran our favorite oil paper a close second for a while in number of articles on petroleum chemistry. But now this nifty is fading out of the picture. You can read all about this unknown literary war of East versus West in the professors' report which appeared on page 199 of last week's issue.

We aren't sure exactly what this proves, but we can make a good guess what our circulation and advertising salesmen will do with it.

Smog Treating

SOMETIMES our engineering writers stick so close to technical matters that they miss all the drama and human interest.

Take, for instance, a factual but prosaic little piece toward the back of last week's issue which faithfully describes how a new plant in Los Angeles makes sulfur from refinery gas.

That's all right as far as it goes, but this department feels beholden to add the supplemental intelligence that the opening of this plant was really a cause celebre on the coast.

The Los Angeles Chamber of Commerce had not said much about it in its travel literature distributed in the East, but the cruel fact is that the area has been having smog trouble. The usual morning high fog, which also isn't mentioned much in the travel literature, had become contaminated with malodorous fumes and grit which, rightly or wrongly, was blamed on the big, bad oil industry. The citrus growers, the movie makers, the sun seekers, and the retired Iowa farmers said the refineries were transforming the City of the Angels into a reasonably accurate facsimile of the opposite abode.

The oil industry denied the blame, but even by working overtime its public-relations men couldn't make much headway until this sulfur-removal plant was built. Now they can claim that if any sulfur fumes still foul the salubrious clime they must be coming from some other culprit. We haven't heard to what extent this has mollified the citizenry, but the moral of the story is probably something about making a virtue out of adversity.

Report to the Nation

A NICE blending of local interests is the annual report of Union Oil Co. of California.

Being located right next door to Hollywood, what is more natural than that the report be made into a movie? Not only that, but televised, too.

The company got out the standard form of annual report (nice job, too, with pictures and big print) but it probably figured that 99.44 per cent of its stockholders only looked at the pictures and didn't bother to study the figures and the discussion. So they decided on a retake with nothing but pictures.

Union pulled the same stunt last year and it was such a wow that it is being repeated on a bigger and better scale. Telecasts in 23 cities and showings in just about every other burg where a crowd can be gathered.

"Prospects Unlimited" is the name of this Hollywoodian version of a C.P.A.'s balance sheet, which shows that California optimism is running true to form.

Precision
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The Matter of Quality

READERS have suggested that we present a rebuttal to an article appearing in a national magazine which they insist lays the entire oil industry open to the charge of resorting to questionable practices in the sales of motor fuels and lubricants. The "expose," as the article has been termed, recently was reproduced in condensed form in a digest publication which claims to have the largest national and international circulation.

We have no desire to enter the argument of many years' standing as to how often motor oil should be changed in an engine. The critic claims that the frequent change recommended at filling stations is not necessary.

This recalls that a few years back a major car manufacturer, following extensive research and investigation, was about to recommend to his customers that the oil in the cars the company manufactures be not changed under 5,000 miles. The program was dropped when top management realized that while satisfactory performance, under controlled operating conditions, might be obtained with extended use of motor oil, the recommended change of the oil companies of from 1,000 to 2,000 miles was, after all, cheap insurance, costing only a few dollars yearly.

It is true that a small percentage of motorists—not 50 per cent as claimed by the author—who pay a 2-cent per gallon premium for the best grade of gasoline could secure satisfactory performance with the regular grade as contended by the magazine author. There is no secret as to what grade of gasoline is recommended by the car and truck manufacturers; and if the owners elect to play safe and "buy the best," that decision comes under the heading of their business. The 2-cent premium for the average family car represents an additional cost not exceeding $15 yearly, or less than the charge for a minor engine repair.

Aside from the conclusions of this author, it is recognized that there are varying positions within the manufacturing divisions of the petroleum industry as to the required specifications for motor fuels. Admittedly there are economic factors to this problem, particularly in these times of decreasing rather than advancing prices at plants, which deserve consideration as to what should be done in the immediate future.

But we doubt that any criticism within or outside the oil industry will alter the long-standing policy of constantly improving product quality. Adding steadily to the octane ratings of motor fuel has enabled car manufacturers to improve the performance of engines, which in turn has not only widened the market for oil and automotive equipment but has strengthened the nation's entire economy. Keeping ahead of requirements in the matter of gasoline quality represents progress; and as to that, the end is not in sight in the oil business.

Texas Commission Told Imports Dropping, Stocks Not Excessive

HOUSTON.—Testimony by 15 oil-company representatives appearing before the state-wide hearing of the Texas Railroad Commission here last week indicated that the present level of crude-oil working stocks is at a safe level—perhaps "a little on the long side," but not excessive.

As requested previously by the commission, oil companies reported their anticipated imports of foreign crude for May and June. Imports for May were estimated at 336,200 bbl. daily and for June 316,700 bbl. daily.

After hearing favorable testimony as to the situation of working stocks and anticipated imports the commission set the May allowable for crude-oil production at 1,981,988 bbl. daily, a cut of 54,079 bbl. daily, the smallest reduction in a series of five consecutive monthly reductions since the first of the year. The lower May daily average will be brought about because there are 31 days in May as compared to the 30 calendar days of April. The number of state-wide producing days remains at 19, with East Texas having 17 producing days.

Most of the oil-company executives presenting their views said that about 250,000,000 bbl. of crude-oil stocks would be adequate, but that the current level of 268,000,000 bbl. is not excessive. Testimony brought out that gasoline stocks should be about 125,000,000 bbl. at the beginning of the consuming season and a level of approximately 93,000,000 bbl. at the close.

Stocks Could Drop

Hines H. Baker, president of Humble Oil & Refining Co., said that current gasoline stocks would approximate 53 to 55 days' supply and that stocks could drop to about 94,000,000 bbl. without alarm.

He reported that California gasoline stocks appeared short by about 2,000,000 to 3,000,000 bbl. and that east of California stocks were long by about 4,000,000 bbl. Asked if there would be ample supplies of heating oils next winter, Baker said that it appeared the industry would be able to meet all demands but that he hardly thought it advisable to encourage "unlimited installation" of heating-oil equipment.

Ralph O. Dietler, representing Standard Oil Co. (Ind.), said that grades of crude stocks were poorly distributed. He said that sour crude was long in the amount of about 18,000,000 bbl. while about 8,000,000 bbl. of sweet crude should be added. For the industry to operate safely about 250,000,000 bbl. of crude stocks would be adequate.

E. D. Cummings, representing Shell Oil Co., Inc., said that company estimates showed that a safe range for the nation's crude-oil working stocks would be between 250,000,000 to 275,000,000 bbl. and that any additions to that would be unnecessary. He said that 128,000,000 bbl. of gasoline stocks would be ample to see the industry through the season.

A spokesman for Socony-Vacuum Oil Co., Inc., and its affiliates reported that demand for crude had greatly increased since 1938 when a similar report to the commission indicated that the safe level for crude stocks was somewhere between 230,000,000 and 260,000,000 bbl. However, the need for a higher stock level is not proportionate to increased demands, he said. Speedier tankers and increased operating efficiency of industry facilities makes a higher proportion of total stocks readily available.

Days' Supply Is Less

Charles A. Perlitz, Jr., vice president of Continental Oil Co., presented a chart to the commission showing that although the industry has a higher stock level than 10 years ago, the total days' supply is less. Continental's estimate for adequate crude-oil working stocks was 45 to 50 days' supply or about 255,000,000 to 285,000,000 bbl.; for gasoline stocks about 52 days' supply or about 130,000,000 bbl.

Sinclair Prairie Oil Co. reported that stocks of crude totaling 260,000,000 bbl. and gasoline of 127,000,000 bbl. at the start of the consuming season should be ample to meet the industry demands.

Anticipated daily imports by the various companies for May and June follow (first figure for May): Atlantic Refining Co., 33,800 and 29,300 bbl.; Cities Service Oil Co., 7,500 bbl. each month; Esso Standard Oil Co., 90,000 bbl. each month; Gulf Oil Corp., 80,100 and 72,800 bbl.; Sinclair Prairie Oil Co., 20,000 bbl. each month; Socony-Vacuum Oil Co., Inc., 72,800 and 67,100 bbl.; Sun Oil Co., none and 4,000 bbl.; and The Texas Co., 32,000 and 26,000 bbl.

Total nominations for crude oil for May were 2,516,271 bbl. daily as compared to nominations for April of 2,545,390 bbl.

May allowables and change by districts as compared to April allowables are:

1. Southwest Texas—28,138, down 293.
2. Southwest Texas—120,406, down 3,825.
3. Gulf Coast—368,183, down 14,703.
4. Southwest Texas—187,705, down 4,816.
5. East Central Texas—35,887, down 1,034.
6. East Texas field—249,968, down 7,937.
6. East Texas (other)—87,153, down 2,322.

7B. West Central Texas — 65,935, down 799.

7C. West Central Texas — 44,029, down 1,031.

8. West Texas—537,264, down 15,531.
9. North Texas—150,399, down 1,782.
10. Panhandle—106,921, down 6.

W. J. Murray, Jr., commission chairman, announced that the next state-wide hearing will be held May 19 in Corpus Christi.

Firms Cut Posted Price On Texas Heavy Crude

HOUSTON.—Humble Oil & Refining Co. announced effective April 25 a 25-cent per barrel reduction in its posted prices for crude oil in Hawkins, Talco, and Sand Flats fields of East Central Texas, in which Humble is the principal producer.

The new price ranges from $2.15 per barrel for oil of 29° gravity and above to $1.95 per barrel for oil below 20° gravity. No change was made in the prices of crude oils purchased from other fields.

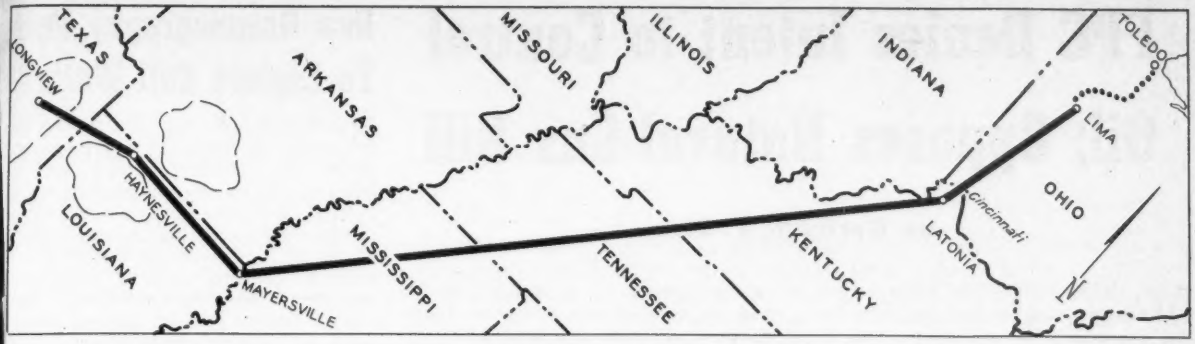
The announcement stated that in order to maintain adequate markets for crude oils produced in Hawkins, Talco, and Sand Flats fields, which are low-gravity crudes with high yields of fuel oils, it is necessary to bring prices more nearly in line with the lower values of these crudes to the refineries because of the sharp decline in fuel-oil prices brought about by changed supply and demand conditions in recent months.

Simultaneously, Magnolia Petroleum Co. announced that it reduced its posted price 25 cents per barrel on all gravities of crude which it purchases in Talco field.

Humble, the largest producer in the three fields concerned, produces 28,214 bbl. and purchases 10,586 bbl. daily of the total production.

Production by Humble in each field follows (second figure is purchases): Hawkins, 21,524 and 4,676 bbl.; Sand Flat, 327 and 1,173 bbl.; Talco 6,363 and 4,737 bbl. April 1 allowable for the three fields amounted to 47,970 bbl. daily as compared to the December 1948 allowable of 96,743 bbl.

Talco Pipe Line Co., Dallas, recently reduced the price it pays for heavy crude in East Texas areas by 30 cents per barrel.



Map shows route of Mid-Valley Pipeline Co.'s 1,000-mile, 22-in. crude-oil pipe line from Longview, Tex., to Lima, Ohio

Sun and Sohio Will Build Big Texas-Ohio Crude Pipe Line

A NEW big-inch crude-oil pipe line to move 150,000 bbl. of Texas crude per day to refineries in the Ohio area will be started this fall by Sun Oil Co. and Standard Oil Co. (Ohio).

The new line will be approximately 1,000 miles long and will have a diameter of 22 in. most of the way, making it one of the largest crude lines in the country. It is announced as a common-carrier line but is designed primarily to serve Sun's refinery at Toledo and Sohio's refineries at Toledo, Cleveland, and Lima, Ohio, and Latonia, Ky., across the Ohio River from Cincinnati.

It will originate in the East Texas field near Longview, where it can connect with the network of pipe lines reaching fields in many parts of the state, and run via Haynesville, La., and Mayersville, Miss., thus being in a position to take crude from fields of North Louisiana and Mississippi.

Capacity 150,000 Bbl. Daily

The line will have a capacity of 150,000 bbl. per day to Cincinnati, and 140,000 bbl. per day beyond to its terminus at Lima. Deliveries to northern Ohio will be made via the system of Buckeye Pipe Line Co. beyond Lima.

There is some speculation in oil circles about the announced terminal of the line in East Texas, and whether the line is eventually to be tied in to West Texas where the biggest surplus of crude supply exists. It is reliably reported, however, that the two companies now have arranged for enough crude along the proposed route to operate at the announced capacity.

Reports indicate that prior to the decision on the new line a thorough study was made by both companies of all possible angles, including the rapid increase of production in Alberta, Canada. Various departments of each company, including the geologists, analyzed possible future developments and their effect on the operation of the line. Apparently the only important economic hazard would be the discovery and development of new large-volume oil fields in Kentucky or Ohio. The geologists considered this unlikely.

Crude Studies Made

Industry sources report that considerable work was done on West Texas crude studies in connection with the new line. Refinery circles indicate there may be a question of the ability of the refineries to be served in Ohio to handle sour crude at the present time.

Cost of the line has been estimated at $56,000,000. A new company known as Mid-Valley Pipeline Co. has been incorporated in Ohio by Sun and Sohio. The line will be financed by funds borrowed from banks and insurance companies in addition to purchases of capital stock in the Mid-Valley company by the two parent concerns, which will share equally in the project.

Construction is scheduled to start this fall, and to be completed early in 1951. There will be seven main pumping stations, two spur-line pumping stations, and four oil terminals. Specifications for initial construction may be issued in September. Design of equipment for the pump stations has not been finally determined, and will depend on prices at which electric and diesel power may be procured.

President of the new company is William C. Kinsolving, president of Susquehanna Pipe Line Co., a Sun subsidiary. Executive vice president is S. H. Elliott, who has long been connected with Sohio's pipe-line operations. Other officers are E. F. Morrill and Birney K. Morse, vice presidents; John Blair Moffett, secretary; and A. E. Wolf, treasurer. The board of directors is composed of the officers and M. E. Newcomer.

Temporary construction headquarters of the Mid-Valley company will be established in the Victoria Building, St. Louis, in charge of E. F. Morrill.

Texas House Committee Favors New Gas Bill

AUSTIN. — A revised natural-gas tax bill which would raise by 1 cent per 1,000 cu. ft. the cost of gas produced or used in Texas, was reported favorably by the house revenue and taxation committee last week.

The house committee amendments to Rep. C. S. McLellan's measure calls for provisions which some observers termed "unconstitutional."

The substitute bill provides that the gas producer be liable for payment of the tax on gas sent out of the state. For gas produced either in Texas or out the tax would be paid by the last purchaser or user. The bill also provides that any electric utility using natural gas as a fuel and required by law to pay the tax shall have the right to readjust its rates for electric service by an amount not to exceed the amount necessary to meet the increase in its fuel bill caused by the payment of such tax.

Esso Lowers Posted Price

Esso Standard Oil Co.'s Louisiana division has announced a reduction in its posted price of 25 cents per barrel on heavy crude oil it purchases in Heidelberg, Eucutta, East Yellow Creek, and Yellow Creek fields of Mississippi.

These fields all produce a heavy asphaltic crude and its chief product is fuel oil. The price cut for these Mississippi crudes, following 2 days after a similar price reduction for heavy crudes in East Texas fields, apparently indicates a trend toward bringing the price of low-gravity crude more in line with the market yield for their principal products.

FPC Denies Intent to Control Oil; Opposes Natural-Gas Bill

by Bertram F. Linz

WASHINGTON.—The Federal Power Commission has no intention of extending its authority over the production of natural gas to regulate the oil industry and, in fact, believes it is without power to do so, the House interstate commerce oil subcommittee was told this week.

The commission's disclaimer was voiced by Commissioner Leland Olds April 25 at the resumption of hearings on bills by Representatives Oren Harris of Arkansas, chairman of the subcommittee, and John E. Lyle, Jr., of Texas which would exempt independent producers and gatherers of natural gas from FPC control under the Natural Gas Act.

"The allegations that the Federal Power Commission might undertake to regulate the oil industry in connection with the regulation of the sales of gas in interstate commerce is completely unfounded," Olds declared. "The commission has no such authority under the Natural Gas Act. It could no more regulate the oil transactions of a company engaged in the oil and gas business than it could regulate a water or telephone utility owned by a natural-gas company. To reiterate, no such authority has been vested in the commission under the Natural Gas Act and any attempt to regulate the oil business would certainly be promptly and categorically condemned by the courts."

Oppose Exemptions

Olds made this statement in representing the arguments of the majority against enactment of the legislation. He and Commissioner Claude L. Draper and Thomas C. Buchanan opposed the exemption of independent producers and gatherers, while Chairman Nelson Lee Smith and Commissioner Harrington Wimberly supported it, provided the legislation is limited to that one point.

Although the FPC majority quitclaimed any authority over the oil industry, it emphasized in a 20-page report on the Harris-Lyle bills that 10 largest of the 600 independent producers of natural gas include 6 oil companies—Phillips, Humble, Stanolind, Skelly, Continental, and Gulf—the the 33 largest companies control 62.5 per cent of the oil and gas acreage held in lease and fee in the United States, while over 50 per cent of the acreage is held by the top 14 companies.

The report also held up the oil industry to support its contention that the exemption of producers would lead to competition between them which would keep the field prices of gas at reasonable levels. In view of the predominant position of the large oil companies in the production of gas, it said, the effect of competition on prices in the regulated oil industry was "essential to a fair appraisal of the situation."

Prices Are Uniform

"Such a test would show that prices charged for oil and gasoline at the wholesale level, within the individual marketing areas of the United States, are uniform to a remarkable degree, notwithstanding that a number of oil companies distribute their products in such market areas," it was asserted. "It would show further that the prices of fuel oil have increased from 50 to 100 per cent since 1940, and that the higher prices have been reflected in the all-time high profits of the oil industry. . . . Suffice it to say that, if competition between oil companies has had such effects through the unregulated oil industry, it can hardly be depended upon to assure the maintenance of reasonable prices for the natural-gas supply of a regulated public-utility industry."

The majority went to considerable length in its report to answer charges made by witnesses at the hearings earlier this month that petroleum companies producing gas with their oil would be subject to control of their entire operations should they sell gas to interstate pipe lines.

The commission's jurisdiction over gas operations may include the incidental extraction of gasoline from natural gas as a byproduct operation but goes no further, the subcommittee was told.

The FPC has not yet had a case in which it has been necessary to determine the cost of producing gas, where gas is produced with oil, the report continued, but should such a case arise "it would be necessary to make a complete assignment of all the operating costs and fixed charges to gas and oil on some fair and equitable basis."

"It is unthinkable that the commission would charge the full production cost to the oil end of the business, charging the gas operations with only incremental costs, or would credit to the gas operations any profits derived from the production of oil," it said. "The commission has

(Continued on page 183)

New Oceanography Unit To Explore Gulf Waters

HOUSTON.—A step toward the solution of many of the problems facing oil operators in the Gulf of Mexico, including engineering difficulties of laying pipe lines, proper design and construction of drilling platforms, and other obstacles of immediate concern to Gulf operators, has been taken by Southwest Research Institute with the establishment of a new oceanography and meteorology division.

Dr. Harold Vagtborg, president of the institute, in announcing the formation of the new unit following a meeting of trustees, said that the new division has two broad objectives in mind: development of fundamental scientific knowledge regarding the Gulf of Mexico, about which relatively little is known—taking in marine life, tides, and the shifting topography of the shelf area; and to have a staff available, and the proper facilities to serve industries concerned with the area. He said that oil companies interested in specific study projects may contract for research on a cost basis, and through its own funds, the institute will carry out extensive research projects whereby several industries active in Gulf waters may benefit through the institute's findings.

Study Physical Aspects

Dr. Vagtborg explained that the new project would embrace the study of such physical aspects of the Gulf as currents, wave motion, weather, chemical content of the water, and effects of weather disturbances, such as hurricanes. It is hoped that through accumulation of this information the oil industry will be enabled to better approach engineering problems connected with Gulf operations.

The new program is scheduled to begin immediately, and preparations are under way to secure a 10-acre site here for a laboratory to carry out the project, and to carry on the petroleum-technology program. A shore laboratory will be constructed at Galveston Island, and a staff of more than 100 technicians will be employed in the proposed laboratory. Dr. Emory N. Kemler, associate director, is in charge at Houston.

A two-masted, 46-ft. schooner with a 115-hp. diesel engine will begin operations in the Corpus Christi area, working eastward over the Continental Shelf.

Similar studies of the Atlantic Ocean have been going on for nearly a century by Woods Hole Oceanographic Institute, and data on the Pacific Ocean are being gathered by the Scripps Oceanographic Institute. Southwest Research will be the first organized study to be made of the Gulf of Mexico.

this week

OUTLOOK—Current oversupply of many products poses problems for the industry, but most leaders predict expanding markets in middle future. . . . ¶Producers of L.P.G. are advised to institute a program of market promotion and summer storage. . . . Told huge potential demand remains to be cultivated. . . . ¶Lube-oil market seen threatened by falling consumption, loss of much export market, and current overproduction. . . . New large plants being completed will add to problems of smaller refiners.

WASHINGTON—FPC still split over need for legislation limiting its powers over natural-gas producers. . . . Majority denies any intent to control oil operations or gas production by independents. . . . But insists competition will not protect consumers unless federal agency retains controls. . . . ¶Antitrust investigation of California producers still under way. . . . ¶Congress unlikely to enact any oil legislation this session, but some observers fear demand for more federal controls will grow out of current oversupply. . . .

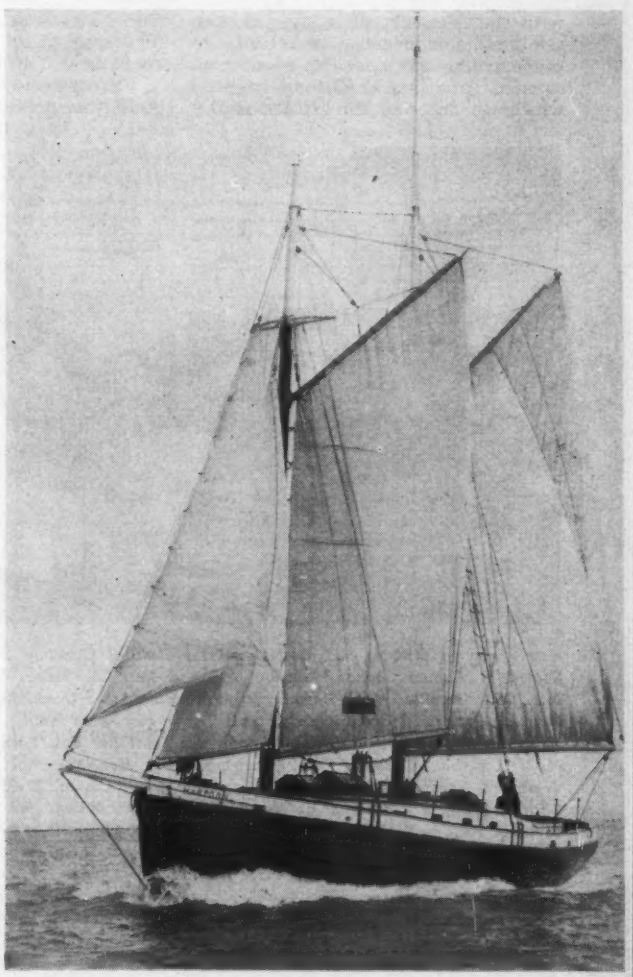
TEXAS—Railroad Commission gets reports on plans of large crude importers. . . . Study of inventories brings opinion stocks are somewhat higher than necessary but not excessive. . . . Latest reduction in allowables may be the last for some time. . . . Commission begins study of MER's of Texas fields. . . . ¶Two companies cut posted prices of low-gravity crude in three East Texas fields. . . .

TRENDS—Crude-oil production for the 6-week period ended April 23 was 6.5 per cent under production in same period last year. . . . ¶General refinery activity based on crude runs for 6 weeks ended April 16 was 3.1 per cent below last year. . . . Gasoline production was up 8.3 per cent. . . . Kerosine production down 18.1 per cent. . . . Distillate production down 12.6 per cent and residual down 8.7 per cent. . . . ¶Gasoline stocks recorded first big seasonal drop during week of April 16. . . . ¶Light and heavy fuel prices were reduced on Gulf and East Coast. . . .

INTERNATIONAL—Foreign crude production up slightly in February. . . . Increase in Middle East more than offset declines elsewhere. . . . But trend appears downward. . . . ¶Mexico's future economy depends on success of 5-year plan of Pemex to expand crude production and refining and distribution capacity. . . . ¶Secretary of Commerce warns that private rather than government funds must develop foreign oil. . . . ¶American companies get first entry into French North Africa for oil exploration.

PIPE LINES—Sun Oil Co. and Standard Oil Co. (Ohio) form new company, Mid-Valley Pipeline Co., to build a 1,000-mile crude-oil line from Longview, Tex., to Lima, Ohio. . . . ¶Texas Pipe Line Co. awards construction contracts for 47 miles of lines in South Texas. . . . ¶Transcontinental Gas Pipe Line Corp. receiving bids on laying 600 miles of 30-in. . . . ¶Wisconsin Southern authorized by FPC to connect with Chicago line. . . . ¶Surplus natural-gas pipe line in Louisiana, which cost $2,800,000, is actively bid upon, with one bid reaching $5,257,000. . . . Final decision of awarding the line will be made at a later date. . . . ¶Imperial Pipe Line completes 8-mile, 8-in. line linking Golden Spike discovery well with existing Leduc-Woodbend pipe-line system. . . . ¶Monterrey Gas building two coated and wrapped lines. . . .

NATURAL GAS—Work is progressing on construction of new gas-compression and dehydration plant being built by Humble and Gulf near Richmond, Tex. . . . ¶Favorable gas bills passed by West Virginia Legislature. . . . ¶Firms agree to purchase approximately 70 per cent of output of proposed 26-in. Trunkline gas pipe line. . . .



Not a reversion to prepetroleum propulsion, but a specially equipped schooner in which the Southwest Research Institute is making a study of the Gulf of Mexico to aid in offshore oil development, as explained on the opposite page

The meeting was brought to a close Friday morning with the association's yearly "Information Session." James E. Pew, acting as Industrial Relations; Perkins—Gas Lines; Bennett—Reservoir Engineering; Wade—Nitrogen Removal; Rettaliata—Gas Turbines; Kirk—

N.G.A.A. Told to Adjust Operations, Plan for Big Future L.P.G. Demand

by D. H. Stormont

FORT WORTH.—The liquefied-petroleum-gas industry is now faced with the necessity of making serious readjustments because of recent unprecedented increases in production capacity and an exceptionally mild winter in areas of the United States where L.P.G. is in greatest demand, members of the Natural Gas Association of America were told here last Thursday at its twenty-eighth annual meeting.

To overcome this situation, Howard Felt, vice president of Warren Petroleum Corp., Tulsa, urged producers and marketers of L.P.G. to take stock of their mutual interests and to plan their operations intelligently.

Newly elected officers and directors of the Natural Gasoline Supply Men's Association. Seated: E. Palmer Shelton, Chicago Bridge & Iron Co., Tulsa; W. H. Edwards, Superior Mfg. Co., Amarillo; M. E. Duncan, Johns-Manville Sales Corp., Tulsa, new treasurer; L. L. Dresser, Dresser Engineering Co., Tulsa, first vice president; J. N. McClure, Elliott Co., Tulsa, president; Dallas S. Deem, American Air Filter Co., Tulsa, second vice president; M. H. Kotzebue, Gasoline Plant Construction Co., Houston; Paul C. Wallack, Walco Engineering & Construction Co., Tulsa. Standing: C. C. Clover, Westcott & Greis, Inc., Tulsa; Charles Wirth, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; M. W. Conn, Perco Division, Phillips Petroleum Co., Bartlesville; M. A. Ellsworth, Fluor Corp., Ltd., Tulsa; Roy R. Bush, Nordstrom Valve Division, Tulsa, retiring president; W. F. Lowe, secretary of the association. Others not present were: Warner Lewis, Warner Lewis Co., Tulsa; George L. Gudenrath, Delta Engineering Corp., Houston; Ray T. Jenkins, Marley Co., Inc., Kansas City; J. A. Mussler, Continental Supply Co., Dallas; R. D. Ricketts, Fish Engineering Corp., Houston; M. H. Roths, Brown & Root, Inc., Houston; J. L. Tullis, J. B. Beaird Co., Inc., Shreveport; and E. C. Wise, General Electric Co., Dallas

Commenting on the increased production of L.P.G., which has come about faster than the marketing branch can develop new outlets, Felt pointed out several factors responsible for the growth. Some of the new facilities were the direct result of more stringent conservation regulations of state regulatory bodies, he said. "Others are the aftermath of the tremendous refinery expansion program, particularly in catalytic cracking, and the result of the enlargement of existing plants, together with more efficient extraction equipment."

Regardless of these factors, and the incentive of attractive prices when supplies were short, he believed these new facilities would not have been constructed if it were not for the vast potential market for L.P.G. In this connection he stated a recent survey revealed that gross sales in the industry were running about $500,000,000 annually, but that there was a potential, but yet unsold, market of $5,000,000,000 annually.

A four-point program was suggested by Felt as a basis for solving the industry's current problem of too much capacity. This was: (1) Each producer of L.P.G. will have to assume his share of the burden of excess summer production, either through establishing his own sales facilities or through use of facilities provided by marketers. (2) Producers should join other segments of the industry in an advertising campaign designed to promote the sale of L.P.G. —"our industry, from producers to

noderator. Those serving on the "Panel of Experts" and their subjects were: Allison—Legal; Manley—General Operations; Foster—California Operations; Murray—Regulations; Willson—Imports, Exports; Shelton—Products Storage; Neal—Marketing; Smith—L.P.G. Safety

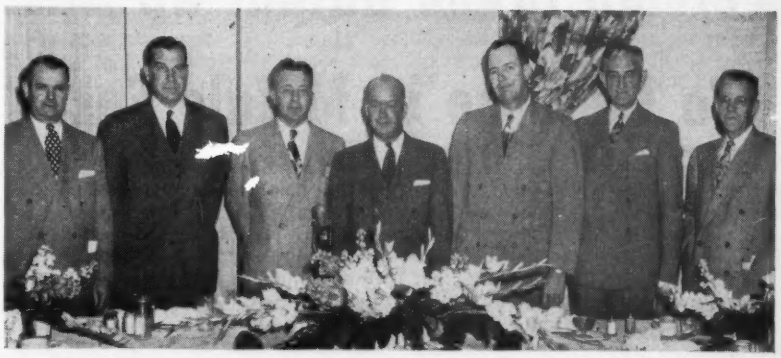
distributors, is woefully lacking in advertising, on a group basis, the product we have to offer the public." (3) Increase plant storage to assist in meeting seasonal demand—"the old rule of 5 days' storage at plants is not adequate." (4) Meet intelligently the competition of other fuels for heating, principally electricity in homes and factories.

Felt also suggested that a report on L.P.G. stocks and production be prepared weekly or monthly as an aid to producers and marketers in charting their course from month to month and season to season. "The huge amount of refinery butanes—which are such a competitive factor to the natural gasoline and cycling-plant producers of L.P.G.—is and always has been a mysteriously unknown quantity; the only definite thing we know is that it comes on the market when least needed."

Concerning transport facilities for L.P.G., Felt estimated there will be about 11,000 tank cars capable of handling L.P.G. in service by the end of this year. On the basis that only about 50 per cent of the L.P.G. is moved by tank cars (the remainder by trucks, pipe lines, ships, etc.) annual production could be in the order of 4,000,000,000 gal. annually before this fleet of tank cars would be taxed to any extent, he added.

In all, 11 papers were delivered during the 3-day meeting, at which a record registration of 1,000 was established. Five of the addresses consisted of reports by chairmen of N.G.A.A. technical committees. In addition, during the Thursday morning session, Ralph Hock of Cotton Valley Operators Committee discussed "Performance and Efficiency of a Gas Cycling Operation;" J. C. Harris of Stanolind Oil & Gas Co., Tulsa, described "Job Training to Increase Opportunities for Operating Personnel" *(both published in the April 21 issue of The Oil and Gas Journal);* and C. H. Van Hartesveldt of Thompson Vita-Meter Corp., Cleveland, gave "Progress Report on Antidetonant Injection in Automotive Engines."

Thursday afternoon in addition to Felt's paper, "Hypersorption," by Dr. Clyde Berg, R. G. Fairfield, D. H. Imhoff, and M. J. Multer, all of Union Oil Co. of California, Los Angeles, was presented. Also, "Trends of the Times" was given by Richard Wagner, president of The Chicago Corp., Chicago. Wagner painted an optimistic picture for the short-time business trend in the United States, but was considerably more pessimistic about the long-term trend. He charged that the nation was headed toward the status of a "welfare state," which he called a form of collectivism, unless governmental tampering with natural economic laws was not eliminated.



Newly elected officers of the Natural Gasoline Association of America: Frank Perry, Cities Service Oil Co., Bartlesville, vice president; A. H. Weil, United Gas Pipe Line Co., Shreveport, vice president; C. R. Williams, The Chicago Corp., Corpus Christi, retiring president; J. E. Pew, Sun Oil Co., Philadelphia, president; John Lynch, La Gloria Corp., Corpus Christi, vice president; Tom Taggart, Standard Oil Co. of California, San Francisco, vice president; W. F. Lowe, secretary of the association, Tulsa

Sam Carney, who recently retired from the gas-gasoline department of Phillips Petroleum Co., Bartlesville, Okla., was given a solid-gold lighter at the president's luncheon Thursday in recognition of his many years of service to the natural-gasoline industry. Carney, previous to joining the Phillips organization, was connected with the Shell companies.

In addition to Pew's advancement to the association's presidency, other officers elected or renamed are shown in the accompanying picture. At the annual membership meeting of the Natural Gasoline Supply Men's Association, J. N. McClure of Elliott Co., Tulsa, was chosen president. McClure and the other officers of this group are also shown on these pages.

Francis E. Rice, vice president of Phillips Petroleum Co., Bartlesville, was presented the Hanlon Award. He was the thirteenth recipient of the award, which is conferred annually by N.G.A.A. for outstanding service to the natural-gasoline and cycling industries. The award was presented to Rice by C. R. Williams of The Chicago Corp., Corpus Christi, retiring N.G.A.A. president. *(See The Oil and Gas Journal, April 21, page 117.)*

In the session devoted to hearing progress reports of N.G.A.A.'s standing technical committees, the report on low-temperature fractional analysis of liquid hydrocarbons was of outstanding interest although no recommendations were offered. The report, presented by the committee's chairman, A. J. Miller of Phillips Petroleum Co., Bartlesville, dealt with the results obtained from 47 oil-company and commercial laboratories analyzing an L.P.G. mixture of known composition. The samples had been blended to an accuracy considered to be within plus or minus 0.05 per cent, by weight, of the total sample.

Average deviation from the synthesis composition of the 80 results reported were as follow for the various individual components: Propane, 1.21 mol per cent; isobutane, 0.90; normal butane, 1.48; and isopentane, 0.95 mol per cent. On the

(Continued on page 183)

Foreign Crude Output Up Due To Increase in Middle East

FOREIGN crude-oil production, excluding Russia and Eastern Europe, approximated 3,338,500 bbl. daily in February, a gain of about 30,000 bbl. or slightly less than 1 per cent over the previous month.

Production in the Middle East rose from 1,358,200 bbl. daily in January to 1,400,200 bbl. daily in February. This rise of more than 3 per cent was more than sufficient to offset another decrease in the Western Hemisphere outside the United States.

Continuing the decline begun late last year, Western Hemisphere crude output in February fell to a reported 1,685,100 bbl. daily. Venezuela, which showed a decline of about 116,000 bbl. daily from December to January, dropped about 12,000 bbl. additionally in February.

Demand Is Easing

These were the principal changes in the over-all production in foreign areas in February. In general, the figures pointed out a further slackening in the rate of increase in demand for foreign crude oil. It is problematical whether the Middle East will show additional substantial increases in production pending completion of the several pipe lines to the Mediterranean Coast.

Together with the 728,000 bbl. daily which is believed to be the approximate daily average crude output of the Soviet Union and the Communist-dominated areas of Eastern Europe, total world production outside the United States in February amounted to about 4,066,600 bbl. daily against 4,035,700 bbl. in January. Some revisions in the January production figures have been made since data for this month were originally compiled *(The Oil and Gas Journal, March 31, page 61)*.

Venezuelan production in February is placed at 1,234,000 bbl. daily, although final official figures for the month have not been received. Venezuelan February production compares to 1,246,000 bbl. daily in January and 1,362,500 bbl. daily in December. Cutbacks in production in Venezuela due to the week market for heavy fuel oil continued in February.

Smaller declines were shown elsewhere in Latin America. Canada showed another increase with continued expansion of output in the fields of northern Alberta. Alberta production for the week ended February 21 was above 50,000 bbl. daily and for the week ended March 14 was 58,364 bbl. daily.

Small increases in production were made in the Netherlands and in Germany. Egypt's production was estimated at about 38,000 bbl. daily, though official information is lacking. Elsewhere in Europe output was little changed.

Most of the increase in production in the Middle East in February was accounted for by Kuwait which reported 256,700 bbl. daily in February compared to 210,600 bbl. in January. Iran's February production shows a small decrease to 527,300 bbl. daily against the January figure of 539,700 bbl. daily which was revised slightly on the basis of a different ton-barrel conversion factor.

Middle East May Fall

Saudi Arabian production increased 532,300 bbl. daily in February but the March figure for this country, already issued, shows output down to 489,800 bbl. daily. This indicates a possible drop next month for the entire Middle East area, and it is known that no large increases in production are planned in Saudi Arabia the rest of this year. The Agha Jari-Bandar Mashur pipe line of Anglo-Iranian Oil Co., Ltd., will allow some increase in production in this country, but the line was not commissioned and tested until the end of March. The decrease in February output is reported due to a temporary operating shutdown of a unit at the Abadan refinery.

FOREIGN CRUDE-OIL PRODUCTION
(In thousands of barrels daily)

Country—	Feb. 1949*	Previous month
Western Hemisphere:		
Argentina	65.4	70.6
Bolivia	1.9	1.9
Brazil	0.4	0.4
Canada	49.5	43.7
Colombia	76.5	82.5
Cuba	0.3	0.3
Ecuador	7.2	7.1
Mexico	153.0	158.1
Peru	40.0	40.1
Trinidad	56.9	55.7
Venezuela	1,234.0	1,246.0
Total	1,685.1	1,706.4
Europe and Africa:		
France	1.0	1.0
French Morocco	0.4	0.4
Germany	14.4	13.4
Italy	0.2	0.2
Netherlands	12.9	11.4
Egypt	38.0	36.1
United Kingdom	0.9	0.9
Total	67.8	63.4
Middle East:		
Bahrein	30.8	30.5
Iran	527.3	539.7
Iraq	53.1	53.5
Kuwait	256.7	210.6
Saudi Arabia	532.3	523.9
Total	1,400.02	1,358.2
Far East:		
British Borneo	65.0	63.0
Burma	0.5	0.6
China	1.8	1.8
India	5.3	5.3
Indonesia	105.0	102.0
Japan	2.6	2.7
New Guinea	4.0	4.0
Pakistan	1.2	1.2
Total	185.4	180.6
Total foreign less Russia and E. Europe	3,338.5	3,308.6
Russia and Eastern Europe:		
Albania	1.0	1.0
Austria	17.5	17.0
Czechoslovakia	0.9	0.9
Hungary	10.0	10.0
Poland	2.6	2.6
Romania	80.0	80.0
Russia	615.0	615.0
Yugoslavia	1.1	1.1
Total	728.1	727.6
Total foreign	4,066.6	4,035.7

*Figures for February are authoritative in the case of all countries in the Middle East and most of the more important producing countries in the Western Hemisphere and Europe. Where a reliable figure for February production was not available, the daily average for a previous month has been carried forward. Figures for Russia and Eastern Europe and some countries of the Far East are estimates only. Other information is compiled from official government or company reports or reliable private data.

Cabinet Officer Urges Private Funds to Develop Foreign Oil

PRIVATE capital will have to bear most of the burden of making effective the "bold new program" for the improvement and growth of underdeveloped areas for which President Truman called in his inaugural address last January, it is declared by Secretary of Commerce Charles Sawyer.

In an address last week at Cape Henry, Va., at memorial services in tribute to the first landing of permanent English settlers in this country, Sawyer said business has the capital, the technical knowledge, and the incentive to do the job, to which the Government can contribute only by arranging that American companies operating abroad enjoy a favorable political climate.

Currently, he said, long-term private American capital invested abroad amounts to about $17,000,000,000. Of this, $11,300,000,000 is in the form of direct business investments in other countries. Oil is the largest single industry in which such investments are being made by American corporations, accounting for about four-fifths of the total in recent periods.

Government participation in the effort to expand our foreign operations —which can be successful only if business can see a profit—could bring about agreements with foreign countries removing the fear of inconvertibility of the foreign earnings of companies into American dollars and the accompanying fear of expropriation.

American Investors Afraid

"Such expropriation has occurred in the past and may occur again in the future," Sawyer admitted. "In addition, American investors are afraid that foreign governments will place serious discriminatory restrictions on their right to manage their business affairs.

"The United States Government can try, through diplomatic channels, to negotiate formal agreements with other nations covering the right of American investors to convert their foreign earnings into dollars, and their right to receive prompt and adequate compensation if their property is requisitioned," he said. "In our effort to establish a favorable climate, it must be made clear that we seek no extraterritorial authority for America or American business. Nor do American businessmen wish protection from the ordinary risks of the market place; nor do we ask any preferential treatment for our businessmen as contrasted with others. We are, however, entitled to ask for them whatever rights we give reciprocally to the business firms of these other countries operating in the United States."

At the same time, Sawyer continued, we must recognize the strong nationalistic feelings which characterize much of the present-day world. "There is in some countries a popular, and perhaps understandable, distrust of foreign capital and motives," he declared. "We should be willing to give ample assurance that the inflow of American capital will not be accompanied by interference with national policies or by American domination of their economies."

Sawyer said that a few American companies, mostly in oil, have already put these precepts into effect with benefit both to themselves and the countries in which they operate. He cited specifically the oil companies in Venezuela.

The secretary emphasized, however, that American capital will go abroad only if it wants to do so. The Government cannot compel it to go, he said, and it will do so only if other countries welcome it.

Oil Concessions Granted in Tunis To Affiliates of Shell, Gulf

OIL concessions have been granted in Tunis to two mixed companies in which 65 per cent interest is held by the Shell organization in one case and by Gulf Oil Corp. in the other.

This was disclosed last week by the French Foreign Ministry in Paris. Reports that the agreements were under negotiation have been pending for several months. The concessions represent the first entrance of major oil companies into French North Africa.

Details of the commitments made by the companies are not known, but the agreements will presumably mark the beginning of a more vigorous search for commercial oil than heretofore in this French protectorate.

As indicated by earlier reports, Gulf and Shell have each set up affiliates in partnership with Soc. d'Ethdes et de Recherches Petroliferes en Tunisie (Serept). Eighty per cent of the capital of this latter company is owned by the French and Tunisian governments.

Serept itself has been conducting exploration and doing some drilling in Tunisia since 1931. No oil has been discovered in substantial quantity, although the prospects are regarded favorable from a geological standpoint. The government-controlled French organization was said to be unable to raise the necessary funds for further work.

While terms of the concessions to Shell and Gulf were not available, it was understood that the area involved was about 4,500,000 acres in each case. All of Tunisia totals about 29,300,000 acres. Serept has held concessions totaling about 389,000 acres in three areas: Ferryville, Cap Bon and Bordure Sahel, and the Central-South.

As reported last week, the agreements provide for the payment of 10 per cent royalty to the local government. In Paris, the French ministry spokesman said the interests of the French and Tunisian governments had been amply protected by the agreements. They were, however, under attack from Communist newspapers.

The Bey of Tunis in late December was reported to have signed a new law that laid the basis for the new concessions. The two new companies to be organized are Serept-Shell and Serept-Gulf. The remaining 35 per cent of the capitalization is to come from the French organization.

Drilling Now Under Way in Northern Part of Syria

Syria Petroleum Co., Ltd., associate of Iraq Petroleum Co., Ltd., is continuing its exploration program in Syria, but no oil has been discovered in any of the wells drilled so far. The firm recently relinquished a third of its concession area, and drilling is now being carried out in the northern part of the country.

The Abba deep test was last reported below 6,200 ft. This well may be carried to 10,000 ft. A second test at Gouna was commenced in January and is now below 2,800 ft.

The company abandoned tests at Bafloun and Dolla. Dolla was taken to a total depth of 10,163 ft. Plans call for a test at Koraschar in the northeast corner of the country, probably following the Abba well. The program is based on the use of three rigs, which allows generally two wells being drilled.

Future of Mexican Economy Depends on Prompt Development of Oil Resources

by Oscar B. Irizzary

THE intense drive by Petroleos Mexicanos for loans and contracts to expand the oil industry of Mexico can easily be understood from a brief study of the country's economy and the outlook for its future.

Mexico's economy today is so dependent on its oil industry that failure to develop its potentialities will practically set back the country to the economic level of colonial days. In view of this danger, the government realizes that it must step up its crude-oil production at least 50 per cent by 1955 if it is to meet the estimated increase in domestic demand and continue to allow a minimum of 23 per cent of its crude for export.

Petroleum is a highly important part of the export trade which Mexico must maintain and increase in order to pay for its needed imports. A chart accompanying this article plots the production and export of crude oil against the imports of all commodities, and strikingly illustrates the importance of oil exports in the Republic's foreign trade balance.

International
WORLD-WIDE OIL DEVELOPMENTS

In 1911, the first year Mexican oil entered the world market, Mexico exported 901,596 bbl. of crude oil and imported 146,464,000 pesos worth of commodities. In 1921, the peak year in Mexico's oil history, exports of crude were 172,268,136 bbl. and imports of commodities were valued at 493,162,000 pesos. From then on exports of oil declined and so did imports. The sharp rise in imports in recent years was due largely to the flow of dollars into Mexico as the result of war activities.

Meanwhile domestic consumption has been increasing and is expected to increase even faster. The accompanying table and chart show the increase in Mexican consumption of petroleum products compared with production of crude since 1940, with estimates for the current and next 5 years.

In 1948 Mexico's crude production averaged 159,481 bbl. daily, and it exported an average of 18,681 bbl. daily of crude and 16,435 bbl. daily of petroleum products. But last year Mexico also imported an estimated 13,034 bbl. daily of refined products (valued at around $25,000,000 for the year) and thus partially nullified the benefit of its oil exports. Imports are largely lubricating oils and greases not now made in Mexico.

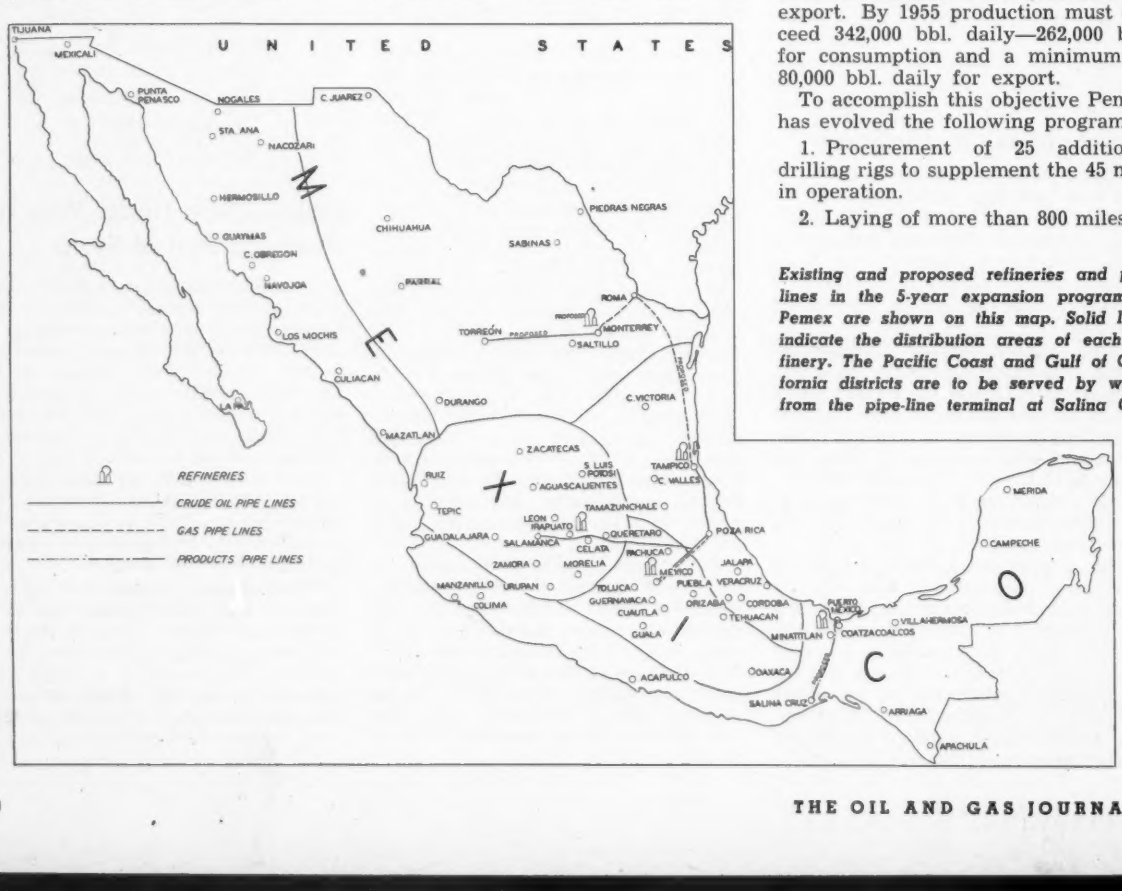
It can thus be seen that unless Mexico can expand its oil production and refining quickly it will soon be unable to supply domestic needs and also its economy will suffer from lack of foreign exchange to purchase needed commodities abroad.

Conservative estimates by Pemex economists indicate that during 1949 the present daily average production of around 160,000 bbl. must be stepped up to at least 190,000 bbl., of which 145,000 bbl. will be needed for domestic demand and 45,000 bbl. for export. By 1955 production must exceed 342,000 bbl. daily—262,000 bbl. for consumption and a minimum of 80,000 bbl. daily for export.

To accomplish this objective Pemex has evolved the following program:

1. Procurement of 25 additional drilling rigs to supplement the 45 now in operation.

2. Laying of more than 800 miles of



Existing and proposed refineries and pipe lines in the 5-year expansion program of Pemex are shown on this map. Solid lines indicate the distribution areas of each refinery. The Pacific Coast and Gulf of California districts are to be served by water from the pipe-line terminal at Salina Cruz

The Author

Oscar B. Irizarry, editor of Petroleo Interamericano, recently spent several weeks in Mexico studying the 5-year expansion plan of Petroleos Mexicanos. This article is condensed from speeches Dr. Irizarry made recently before Nomads chapters in Houston and Tulsa, and is based on first-hand information obtained from officials of Pemex.

ipe lines for crude, products, and atural gas.

3. Completion by 1950 of the 30,000 bbl. per day cracking and topping plant at Salamanca, now under construction.

4. Construction of a new refinery at Monterrey with capacity of 10,000 bbl. daily.

5. Construction of a new refinery at Guadalajara with capacity of 10,000 bbl. daily.

6. Construction of a repressuring plant at Poza Rica field to cost some $11,000,000 and handle between 35,000,000 and 50,000,00 cu. ft. of gas per day.

7. Addition of compressors to the present crude stabilization plant at Poza Rica to double the present pressure and thus handle 100,000,000 cu. ft. of gas.

8. Completion of the dehydration plant now under construction at Poza Rica.

9. Addition of a lubrication and paraffin plant to the Atzcapotzalco (Mexico City) refinery with a daily capacity of 1,500 bbl. of lubricants and 65 tons of paraffin.

10. Addition of a cracking unit to the Ciudad Madero refinery at Tampico, estimated to cost $5,000,000.

11. Ultimate construction of a refinery with capacity of 10,000 bbl. daily at Torreon, near Monterrey.

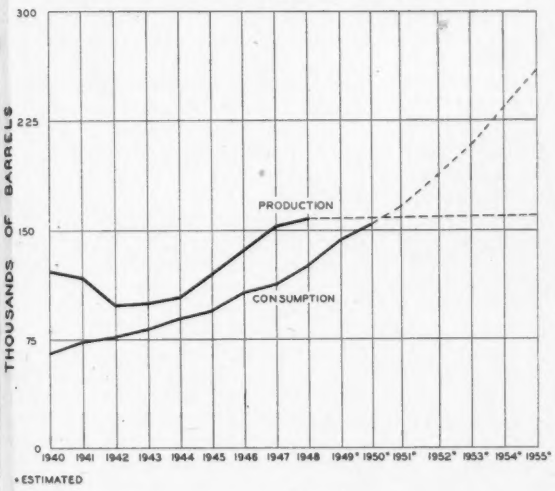
Existing refineries are located at Tampico, Mexico City, and Minatitlan, and their combined throughput is 130,000 bbl. per day. The new Salamanca refinery will not be in operation until the early part of 1950. The accompanying map shows the location of the present and proposed refineries and pipe lines, and the projected marketing areas of the refineries.

The West Coast of Mexico is proposed to be served by water transportation from Salina Cruz, the terminus of a projected products pipe line across the Isthmus of Tehuantepec, originating at the Minatitlan refinery. A crude-oil line is now being constructed from Poza Rica field to the new Salamanca refinery, but about 200 miles remain to be completed. Other projected pipe lines are: a crude line from Salamanca to Guadalajara (should a refinery be built at Guadalajara), 155 miles; a gas line from Reynosa field to Tampico, 311 miles; a crude line from Reynosa to Monterrey, 145 miles; and extension of the Reynosa-Monterrey crude line to the site of the proposed Torreon refinery, 187 miles.

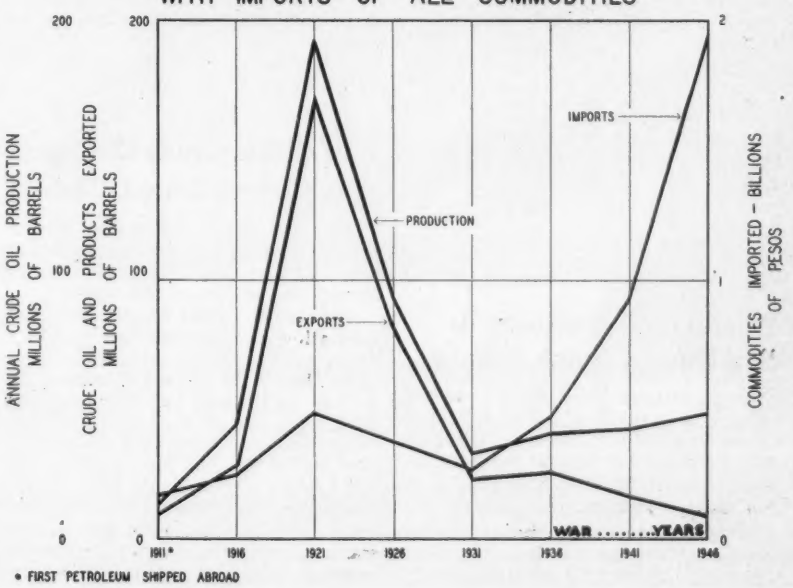
The total cost of this 5-year program has been estimated in the neighborhood of $470,000,000. Antonio J. Bermudez, director general of Pemex, believes that if the drilling program is started immediately it can increase Mexican crude production from the 1948 level of 159,481 bbl. per day to 365,000 bbl. daily by 1953 and to 463,000 bbl. daily by 1955, which is far above the minimum goals. The latter figure, it is estimated, will take care of domestic requirements and provide exports of crude and products of some 280,000 bbl. daily with a value of $170,000,000 per year.

In anticipation of obtaining loans or satisfactory drilling contracts, Pemex has been conducting intensive exploration work, spending $350,000 per month to maintain 30 geophysical and other exploration crews in the field.

MEXICO'S PRODUCTION AND CONSUMPTION



PRODUCTION AND EXPORTS OF PETROLEUM COMPARED WITH IMPORTS OF ALL COMMODITIES



More than 100 structures have been located. Pemex drilled 82 wells in 1948 and the program for the current year calls for drilling 152 wells by Pemex crews and 23 by contractors, in addition to whatever drilling is done this year under the new contract with the American Independent Oil Co. group.

At present Pemex has 45 drilling rigs in operation—20 in development work, 16 in wildcatting operations, and 9 on workover jobs. Three-quarters of the rigs are modern and in good condition.

Most geologists believe that Mexico has very extensive reserves of petroleum yet to be discovered. Pemex's development plan has been carefully worked out to discover these reserves and to make the best use of the crude confidently expected to be found. The chief obstacles to fruition are lack of funds to purchase the necessary equipment abroad, and the determination of Mexicans to retain control of their petroleum industry and permit the entry of foreign companies only in the capacity of contractors rather than proprietors.

Mexicans believe that the success of the oil program is not only a matter of national pride but of the utmost importance to the future of the nation's economy. This explains the persistence of Director General Bermudez during his current visit in the United States in attempting to secure loans so that Pemex can do the work itself and contract with American oil men to undertake a portion of the program.

MEXICO'S PRODUCTION AND CONSUMPTION OF PETROLEUM

	Prod., bbl. daily	Consumption— Bbl. daily	Increase, per cent
1940	120,320	65,305	— 4.6
1941	115,610	74,169	+13.3
1942	95,380	77,948	+ 5.1
1943	96,340	80,919	+ 3.8
1944	104,380	91,045	+12.8
1945	119,310	97,246	+ 6.5
1946	134,890	108,667	+11.8
1947	153,800	114,635	+ 5.3
1948	159,481	126,427	+10.9
*1949	187,220	143,620	+13.5
*1950	200,200	153,600	+ 6.8
*1951	215,790	165,490	+ 7.7
*1952	243,750	185,750	+12.2
*1953	270,530	207,530	+11.6
*1954	304,310	233,310	+12.4
*1955	341,030	261,530	+12.0

*Figures for 1949-1955 are estimates.

Possible Oil Discovery Is Reported in South France

A possible oil discovery is reported to have been made in southern France by a well drilled by Soc. Nationale des Petroles du Languedoc Mediterreen (S.N.P.L.M.) about 14 km. from the town of Beziers.

Reports were that the discovery was made at about 1,400 m. (about 4,600 ft.). After a drill-stem test which indicated a small amount of oil, the operators were reported to be preparing to run casing and complete the well. The well was in the Permian at the depth tested.

S.N.P.L.M. holds a concession over a large area of southern France bordering the Mediterranean Coast. Its drilling program is part of the intensive effort France is making to find more substantial quantities of indigenous crude. About 20 km. north of Biziers is the old shallow Gabian field where about 50 wells were drilled between 1924 and 1930, but with a production at present of only a few barrels daily.

Yugoslavia Arranges to Buy U.S. Oil Equipment

THE Ministry of Mines of the Yugoslav Government has arranged the purchase from Continental Supply Co., Inc., of oil-field equipment, including rigs and tubular goods, for the development of the country's oil resources.

The deal was disclosed by Paul F. Lowinger, New York exporter who represented Continental Supply in Belgrade. He said in Zurich, Switzerland, that United States export licenses had been issued, and the first shipments would be sent to the Fisak fields in Croatia late next month.

The possibility of a reopening of the Yugoslav market has been of interest for some time among equipment exporters in New York.

Foster Wheeler Corp. also is understood to be negotiating with the Yugoslav Government on the possible construction of refining and natural-gas processing facilities. Representatives of other equipment companies were recently in Belgrade.

No up-to-date figures are available on the Yugoslav oil industry, but the country has a 5-year plan calling for the production of nearly 10,000 bbl. daily by the end of 1951.

Iran's New Crude-Oil Pipe Line Commissioned, Tested

The new Agha Jari-Bandar Mashur crude-oil pipe line of Anglo-Iranian Oil Co., Ltd., in Iran was commissioned and tested on March 31.

Completion of the 20 and 22-in. line will allow the company to move approximately 100,000 bbl. daily from Agha Jari field to tanker-loading facilities at Bandar Mashur. Gravity flow is employed in the 56-mile line which was laid by A.I.O.C. personnel.

Work on the line started early last fall. Steel came from the United States, and the Government granted an export license with the understanding the project would make additional crude available to relieve

the then-existing shortage in the United States. Now, however, there are no United States buyers for the oil, and it is scheduled to go to other world markets.

Middle East Imports Hit High Level in February

WASHINGTON.—Imports of crude from the Middle East hit a new high in February with an average of 173,000 bbl. daily compared with 157,000 bbl. in January, according to figures of the Department of Commerce.

A full half of the Middle East imports originated in Saudi Arabia—87,000 bbl. daily against 56,000 bbl. the previous month—with Kuwait furnishing 70,000 bbl. daily against 68,000 bbl. There were no receipts from Iraq, which provided 7,000 bbl. daily in January, and entries from Iran declined to 16,000 bbl. daily from 26,000 bbl.

Imports from Venezuela showed a sharp decline, from 282,000 bbl. daily in January to 249,000 bbl. a day the following month, while receipts from Colombia dropped from 27,000 to 24,000 bbl., and those from Mexico increased from 8,000 to 13,000 bbl.

Refined-product imports dropped from 172,000 to 153,000 bbl. daily, all from the Netherland West Indies, and total receipts of all oils declined from 646,000 to 612,000 bbl. daily. Imports free of duty for vessels increased from 63,000 to 69,000 bbl. a day, but dutiable imports fell from 583,000 to 543,000 bbl. daily.

Maritime Commission Plans To Build 10 Large Tankers

WASHINGTON.—The Maritime Commission is hopeful of getting construction started during the coming fiscal year on 10 large tankers, on which it proposes to expend $23,000,000 for national-defense features.

The new vessels will be built on orders to be placed by oil companies at a cost to them estimated at between $60,000,000 and $70,000,000, or possibly less if ship construction costs drop.

The tankers will be 630 ft. long at the waterline, with a beam of 83 ft. with 20,000 hp. engines capable of giving a speed of 18.5 knots. Their deadweight tonnage will be 24,000 and the gross tonnage 18,500, and they will have a carrying capacity of 217,500 bbl. each and require a crew of 56 men.

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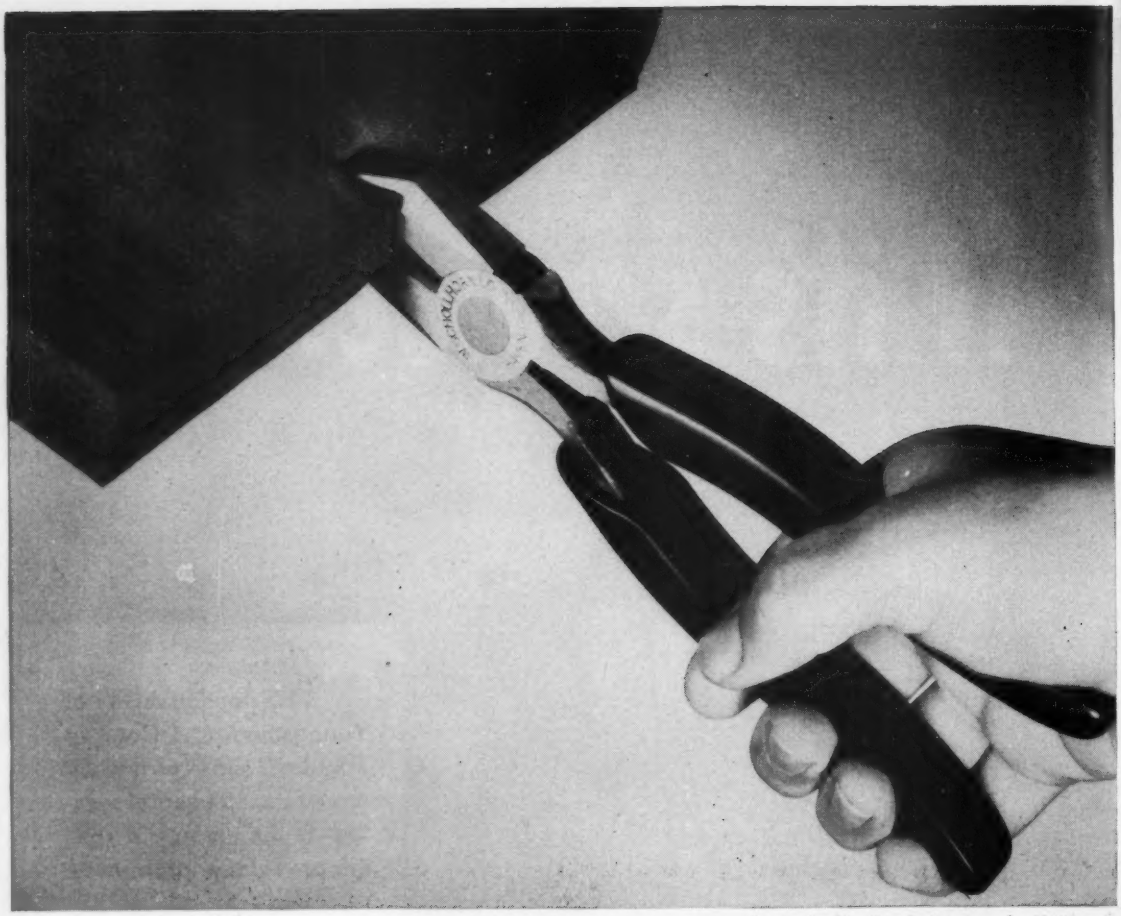

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WASHINGTON WATCHING

BY BERTRAM F. LINZ

Inactive on Oil

WASHINGTON. — Congressional committees may yet make extensive investigations of the oil industry but there is practically no likelihood of any legislative action at this session of Congress.

The session already has passed the half-way mark with oil practically ignored except for the introduction of bills, most of which relate to the tidelands. But Congress has not dealt with half the program proposed by President Truman, and while few administration measures will be enacted, many will be discussed on the floors of House and Senate.

The House interstate commerce oil subcommittee is expected to open its long-promised study of the oil situation sometime next month, but there is no indication that it has any definite legislation in view and its inquiry will be directed toward bringing members up to date on world oil developments.

Hearings also are expected to be called soon on tidelands legislation, but again there will probably be no action, in this instance because both sides are strong but neither feels it is strong enough to defeat the other. The weakness appears to be more on the administration side, the supporters of state ownership expressing confidence that they have enough votes to defeat the administration bill for federal administration of the tidelands or to put over their bill restoring title to the states, but conceding they could not make the latter law over a veto by President Truman.

There is a probability that the House may get legislation depriving the Federal Power Commission of jurisdiction over the production and gathering of natural gas, but whether it would get through the Senate this year would depend upon how quickly it could be taken up and how determined the opposition would be. The Rizley bill passed the House readily in the last Congress, but bogged down in the Senate.

New Ill, Same Remedy

ADMINISTRATION officials no longer have nightmares about inflation. Instead, they are chased through their dreams by the specter of depression, and they hope to do something about it shortly.

President Truman's top strategists are dusting off his stabilized-economy bill and are preparing new arguments to make Congress see the measure not only as a safeguard against inflation but a protection against a slump.

Government expansion of productive capacity, they contend, can be equally effective as a shot in the arm for an anemic economy or as a means of eliminating shortages.

At the same time, the standby authority for price and limited wage ceilings will be left in the bill, because they were promised by the President during the campaign and because of fears that currently sagging prices might suddenly tighten up and take off on a new race upward.

The antiinflation bill was introduced in Congress last February and has been resting comfortably in committee files ever since, simply because Congress was not convinced that the country was in such a desperate plight that the drastic course recommended by the President was necessary.

Within the next few weeks, unless there is a decided upturn in employment and business, it is expected a new effort will be made to spur the banking committees into consideration of the stabilization bill, which bids fair to become the administration's Indian medicine for all ills.

Pessimistic View

LIFE is just one fear after another for those in the oil industry who are on the lookout for threats of government control.

A year ago, industry leaders saw threats of government control of the industry as a result of an oil "shortage" which had consumers and Congress all worked up. Today, some in the industry see new threats of the Government's heavy hand should the current situation of excess supply lead to a diminution of development efforts which would bring a new shortage in the event of a sudden spurt in demand.

These men point up the situation in this way: Several price cuts have been made in the Pennsylvania Grade fields which have had the effect of halting drilling by all but the best-heeled operators; small refiners along the Gulf are beginning to shut down because of cuts in fuel-oil prices which have wiped out margins; while repeated cutbacks in allowables in Texas and other states, based on heavy imports, have had the effect of supporting crude prices so that no relief is in sight at the crude end.

Well completions are still running ahead of last year, these men say, but they represent effort started before the present situation developed, and its effects might show up in a reduction in wells started as lower profits reduce the risk money available. Such a situation would bear most heavily on the independents, who would find it increasingly difficult to raise money.

Continuation of such trends, it is contended, could have a retarding effect on the discovery of new reserves, and find the industry, in the event of a sudden upsurge in demand, in much the same position it was a year or so ago.

Should such a condition develop, it is feared by many, the administration's pressure for government controls, development of a synthetic-fuels industry, and other ideas which have been advanced from time to time would be irresistible.

Tax Talk

PROSPECTS of legislation to boost federal taxes on business, if not this year then next, have been increased as a result of recent developments.

Congress has authorized the appropriation of the full sum asked for continuation of the European Recovery Program, despite efforts of economy minded members to reduce the $5,580,000,000 by 10 per cent.

The administration program for implementing the North Atlantic pact calls for $1,500,000,000 for rearmament of Europe.

The House has voted an appropriation of $16,000,000,000 for the armed services, considerably more than was originally requested; cuts in other appropriations have been very light, and there is no indication that any of the Hoover Commission's economy proposals, which would save $3,000,000,000 or more a year, will get to first base this year.

Preliminary estimates indicate that the tax revenues of the Treasury will be substantially less this year than last, because of the gradual recession in business.

Congressional leaders are still opposed to any increase in taxes this year, but they are beginning to talk of increases which would go into effect in 1950 although they are confident the total can be kept below the $4,000,000,000 requested by President Truman.

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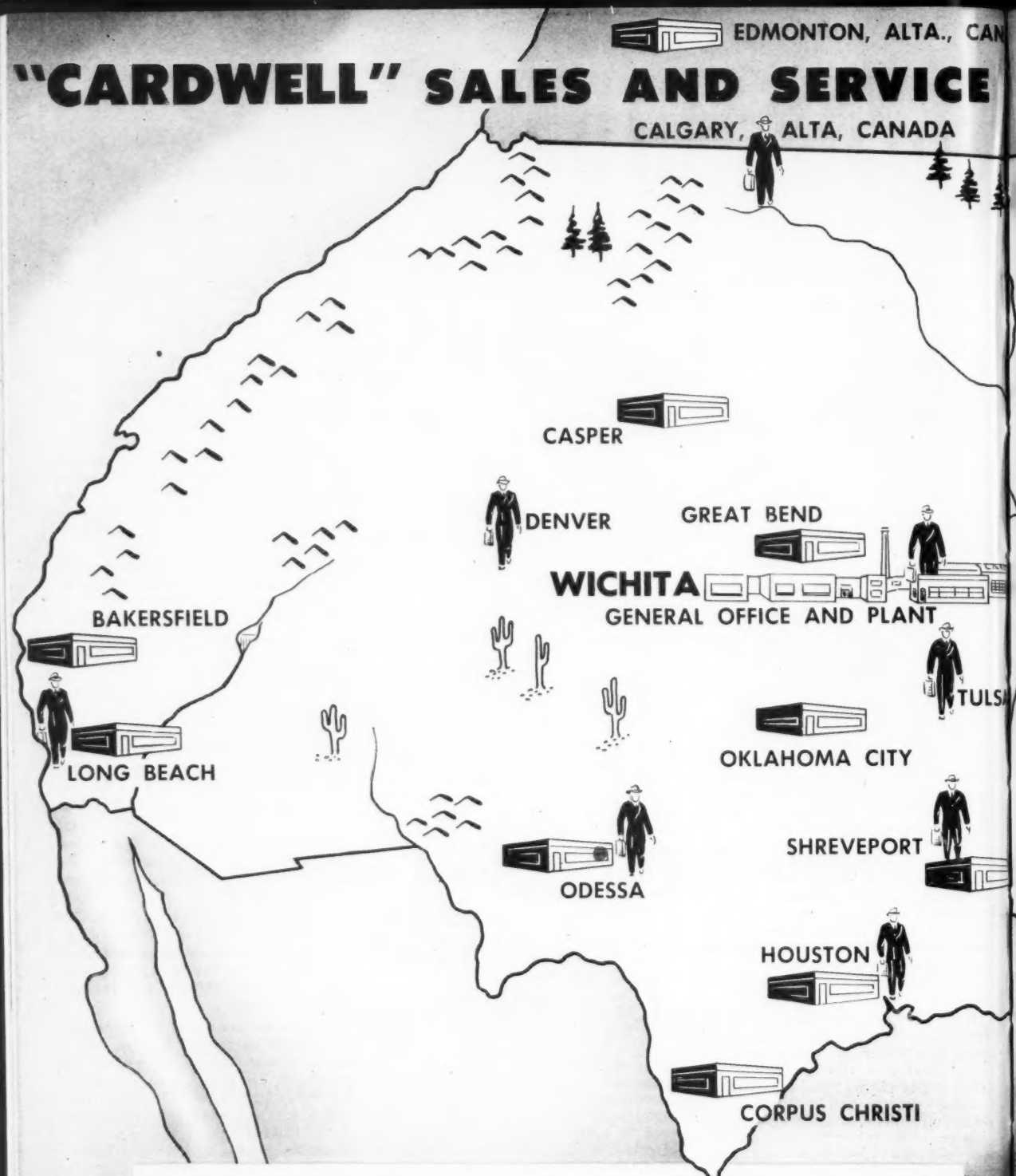

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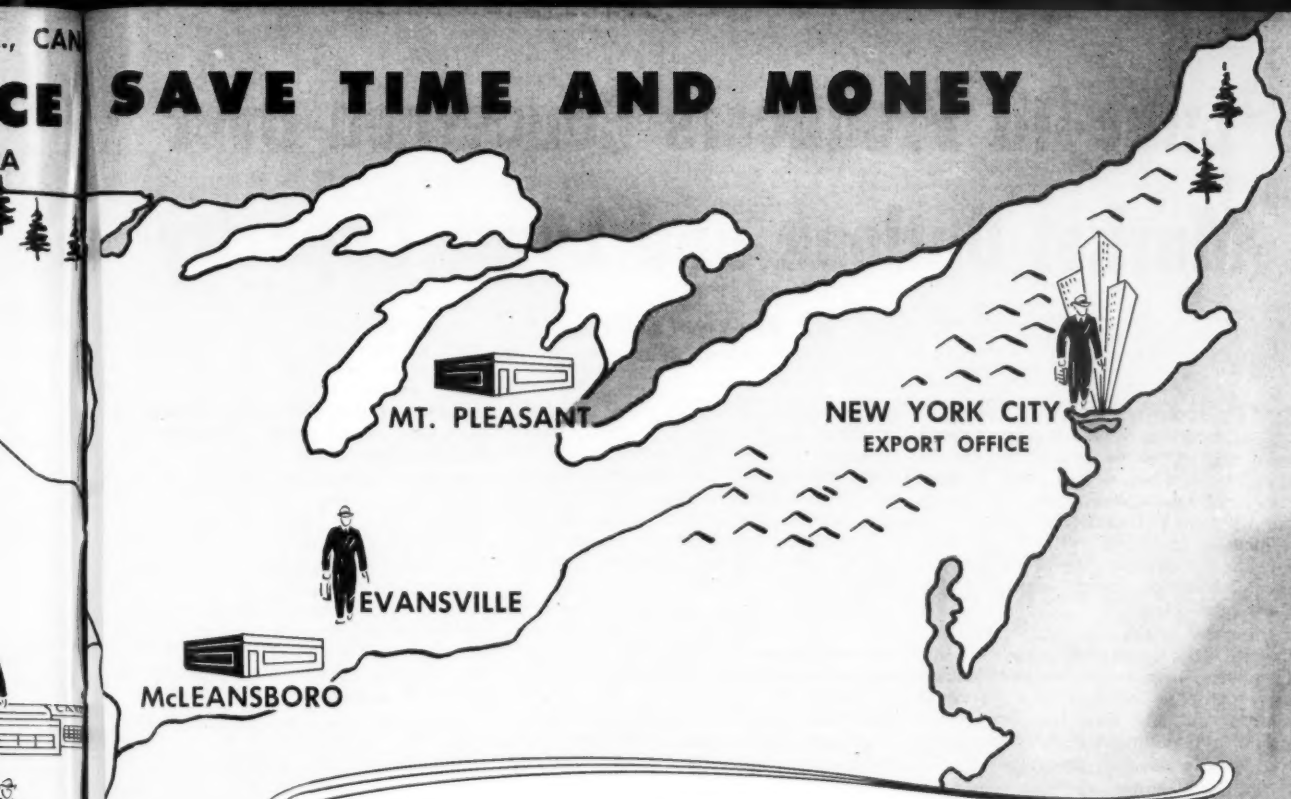

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WHEN IT'S A "CARDWELL," THERE'S NO EQUAL IN QUALITY

Lube-Oil Producers Concerned Over Market Outlook and Large Capacity

by George Weber
Refining Editor

THE petroleum-lubricants market is undergoing one of the most rapid reversals in the history of the industry. The sudden switch from a firm lube position to one of current oversupply is a matter of real concern to a large segment of refiners, particularly those smaller operators without established long-term contracts for their products.

Concern arises not only from the present weak market position, but from the prospects for the future. Developments of the next several months indicate that the margin of supply over demand will not be effectively relieved this year.

This surprising aftermath of firm prices and allocations of production in effect only a year ago is the result of a number of factors. The current record-breaking installation of modern lube-oil refining facilities comprises the major factor, to be aggravated as new units continue to go on stream this year and next.

Exports also affect the picture. The combination of dollar shortages and new construction abroad is beginning to be felt. Despite expected record oil consumption during the forthcoming motoring season, still another long-range trend may well temper the resulting gain in motor-oil consumption. This factor involves the increasing efficiency of automotive engines from the standpoint of oil consumption and an inclination on the part of the motorist toward longer drain periods.

Offsetting these cumulative effects to some extent is a sustained or growing demand for industrial lubricants especially for diesel engines. To students of the market, the entire lubricants situation arises not so much from any slackening in demand but from the additions to processing capacity.

The effect is visibly reflected in the present weak price position held by lube stocks. Bright stocks and neutral oils have sustained continuous price reductions. For example, Pennsylvania bright stock, which some months ago brought 40 cents, was selling as low as 16¾ cents per gallon in mid-April—lower in some cases than similar stocks from Mid-Continent oils. Neutrals are off 50 per cent in some areas. These reductions in bright-stock and neutral quotations explain the recent series of decreases in posted schedules for Pennsylvania Grade crude oil.

While a difference of opinion still exists as to the ultimate result of present trends, many observers believe that a major relocation of the lubricating-oil industry is definitely under way. Technology plays a major part in this appraisal. Modern methods for vacuum distillation, extractive refining, and dewaxing have widened the base of crude types suitable as lubricant sources.

Moreover, modern manufacturing units are characterized by a large volume throughput. Installed logically in refineries of major size, they represent huge investments which must be returned by capacity operations. Their production will greatly reduce the outside purchases of base stocks which formerly supplied many companies with blending stocks for their branded oils.

The move toward greater self-sufficiency on the part of former buyers in the open market stems in part from the dislocation of supply both during the war and during the seller's market immediately following. The effect will thus be felt most severely by the independent refiner regardless of his geological location or the type of crude he processes.

Typical of the large, modern units in the current record program of constructing lubricating-oil plants is this phenol extraction section which has a capacity of 5,800 bbl. per day, part of Shell Oil Co.'s combination lube unit at Houston

Co-ops Are a Factor

Cooperatives are exerting a similar trend toward self-sufficiency, relatively unimportant in the national picture, but of real concern in some localities. By construction of new facilities and purchase of existing lube plants, they are channeling added lubricant products to member buyers who formerly purchased from outside.

Attention is focused on the Pennsylvania Grade crude refiner whose business is based directly on lubricant manufacture. Indications of distress are evident in that region. Pennsylvania Grade crude stocks stand at 2,900,000 bbl., more than double the volume stored above ground at the end of the war. Finished lube stocks exceed 1,000,000 bbl.

At recent meetings in Oil City and Titusville a cooperative effort was launched by producers and refiners to seek some relief from the serious Pennsylvania situation. The following resolution was adopted by

a joint committee representing the regional industry:

"Whereas during the recent war our armed forces used such large quantities of Pennsylvania Grade lubricants that many important domestic outlets were lost and whereas this has caused a large accumulation of lubricating stocks, serious price reductions of both crude and refined products, and unemployment in the entire Pennsylvania Grade district, be it resolved that a committee be appointed from the Middle District Oil Producers Association to confer with Bradford District Oil Producers Association and Pennsylvania Grade Crude Oil Association for the purpose of presenting these facts to proper federal authorities and attempting to have our armed forces acquire at this time a substantial quantity of Pennsylvania lubricants so as to afford relief for this serious situation."

Military stockpiling is proposed as a conservation means, to sustain production of Pennsylvania crude, some of which may be abandoned without such support.

A straw in the wind may be the closing last week of the Independent refinery of Quaker State Oil Refining Corp. at Oil City, Pa., for 1 month. Reason given for closing the 2,800-bbl. refinery, which is capable of producing 600 bbl. daily of finished lubricants, was the "falling off in demand for Pennsylvania Grade crude products."

Stocks Rising Rapidly

National statistics now available do not yet fully show the impact of the rapid developments in the lube situation. January stocks of all lubricants, according to the American Petroleum Institute, stood at 10,326,000 bbl. Additions since that date are believed to have brought the total to a new high, exceeding the previous record of 10,827,000 bbl. at the end of 1930. Production in recent months has approached the record volume of 148,600 bbl. daily, set in May 1947. Exports, on the other hand, have shown some leveling off since the early postwar period. Two years ago exports exceeded 40,000 bbl. daily, while recent totals average nearer 30,000 bbl. daily. Imports of finished lubricants remain negligible.

The ratio of domestic volume demand for automotive motor oils to that for highway fuel has indicated the gradual decline in oil consumption since the war. Percentage of oil over gasoline for highway use declined from 2.85 per cent in 1947 to 2.76 per cent in 1948, and an estimate for 1949 demand shows 2.72 per cent. *(The Oil and Gas Journal, January 27, 1949, page 190.)*

The same source shows total lubricants and wax as constituting a volume percentage of total petroleum products of 1.96 per cent in 1947, 1.80 per cent in 1948, and an estimated 1.82 per cent for 1949. Actual service-station ratios of branded oils to regular and premium fuels have been projected by some large integrated companies as 2.1 per cent for postwar volume demand, but one company is thinking in terms of relatively near-future figures averaging close to 1.5 per cent.

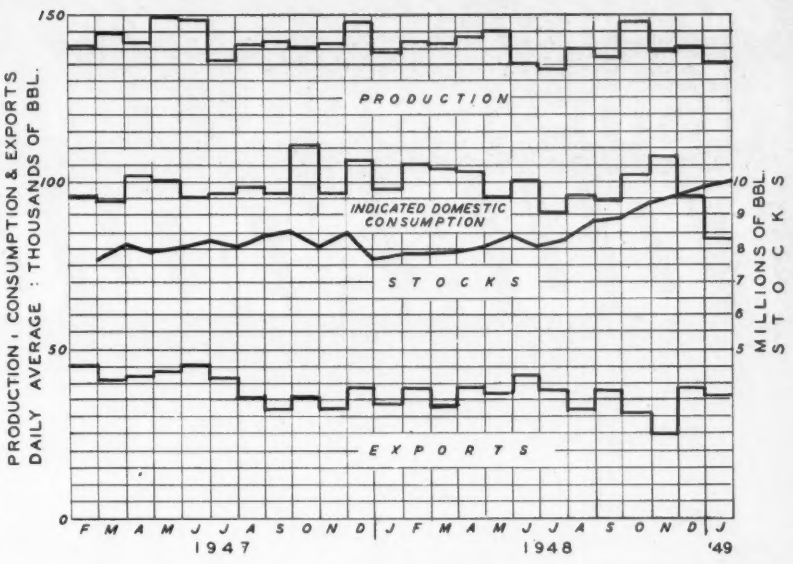

Chart of activity in the lubricating-oil industry during the past 2 years, showing how stocks have been climbing in recent months while consumption and exports seem headed downward

Export Prospect Dim

The full effect of export declines is not yet apparent statistically, but the trend is most apparent to suppliers abroad. England, for example, which has purchased about 1,300,000 bbl. of American lubricants a year, is expected to reduce such imports by one-half this year. Completion of national facilities and greater reliance on sterling areas such as Curacao will reduce British imports from this country to a very small volume by 1952. Other European countries are including lubricating-oil manufacture in their projects toward greater self-sufficiency in petroleum products. Despite several postponements in plants proposed for Europe by both European and American companies, that continent will reduce imports to a figure comparable with Britain's by 1952, it is anticipated.

Although less important volume-wise, the South American market for American lubricants is likewise declining. Venezuela and Argentina will become virtually self-sufficient on completion of lubricating-oil facilities now under construction. Dollar shortages elsewhere will show their effect in greater lube imports from countries other than United States, where available.

Some indication of the impact of new plant construction on the lubricants field is revealed in reviewing estimated figures on new and existing capacities. *(The Oil and Gas Journal, January 27, 1949, page 201, and a survey of domestic refineries producing lubricants, compiled in April 1949 by the National Petroleum Association.)*

Approximately 29,000 bbl. of daily capacity for finished lubricating oils is represented in projects recently completed or due to go on stream this year and in early 1950. This figure, added to existing plant capacities, gives an estimated total of 178,000 bbl. daily. Direct addition of new capacity to old does not reflect the true picture since an unsurveyed amount of older facilities will be retired on initial operation of more efficient units. However, the operation of nearly 30,000 bbl. daily of new capacity at near-capacity level will exert a tremendous effect on the economy of maintaining many older units in operation at all.

New Plants Are Large

Some measure of the growing concentration of lubricant manufacture in large units is gained by comparing new projects with existing plants. While the average finished lube capacity per existing plant is less than 2,000 bbl. daily, only 24 refineries in this country are capable of producing 2,000 bbl. per day or more. They comprise less than 30 per cent of the total number of plants but total about 80 per cent of capacity. Further concentration of capacity is reflected in the 11 major projects recently completed or under construction. These projects average about 2,600 bbl. each of finished-product capacity, most of them being added to existing large plants.

Charge capacities of new solvent refining units total 40,000 bbl. daily. Dewaxing units just completed or

(Continued on page 183)

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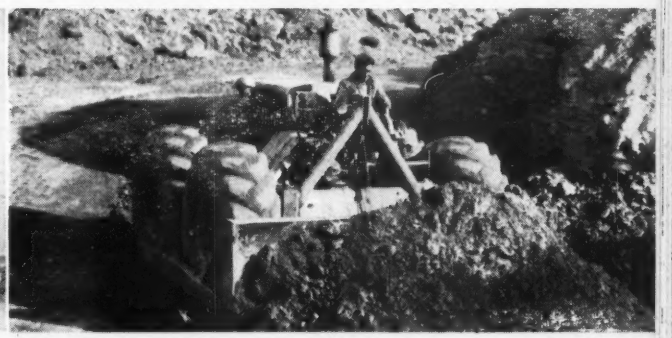

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Jersey's Affiliates Produced 1,075,000 Bbl. Daily in 1948

REQUIREMENTS for petroleum products will probably be slightly higher in 1949 than in 1948, but despite the prospect for a higher volume of business it appears that earnings will be lower this year, principally because of lower product prices, Eugene Holman, president, Standard Oil Co. (N. J.), told stockholders in the company's annual report.

Holman said the company based its views upon anticipated higher demands by motorists for gasoline, by home owners for heating oil, and by railroads for diesel fuel.

"Requirements of the company and its affiliates for capital expenditures will continue high, although somewhat below the level of 1948," he said. "Such expenditures are creating capacity to meet future consumer needs, and are improving efficiency of operations, thus increasing the value of the enterprise."

The company's annual report shows that net production of crude oil by affiliates of the company averaged 1,075,000 bbl. daily in 1948, an increase of 8 per cent over the preceding year. Of this amount, domestic affiliates averaged 428,000 bbl. daily. In addition, domestic affiliates purchased an average of 925,000 bbl. of crude daily from independent producers, and sold 605,000 bbl. per day to other refiners. Foreign affiliates produced an average of 647,000 bbl. daily, and net purchases amounted to 28,000 bbl. daily.

Many Records Set

The report discloses that all-time records were set, not only in production of crude, but in refinery runs, exploration, drilling, pipe-line operations, transportation, research, and marketing. The company earned more during 1948 than at any other time in its history.

Expenditures made by consolidated companies for additions to property, plant, and equipment in 1948 were $529,415,000, an increase of 24 per cent over the record expenditures of 1947. Net investment in property, plant, and equipment as of December 31, 1948, was $1,858,675,000.

The company spent $374,000,000 during the year for exploration and development, and more wells were drilled than at any time previously. As a result of the vigorous activity, not only was production raised to record levels, but additions to proven reserves of affiliates in the United States were approximately equal to their production for the year. Foreign affiliates also added to their reserves substantially, in spite of increased production.

Further exploration, deeper drilling, and development of previously known fields contributed greatly to Standard's domestic record of production. An outstanding discovery was made by Humble Oil & Refining Co. (Jersey has a 72 per cent stock interest) of two fields on the Continental Shelf, off the coast of Louisiana. Two important discoveries were made in Alberta, Canada, by the Canadian affiliate, Imperial Oil, Ltd. (Jersey owns 70 per cent stock interest). First was the Woodbend pool, where production began January 28, 1948, and second was Redwater field, about 45 miles northeast of Edmonton, and 65 miles from Leduc.

Exploratory efforts in Venezuela by Creole Petroleum Corp. (93 per cent owned by Jersey) were rewarded by substantial increases in proven reserves in the Lake Maracaibo and Quiriquire fields.

Made High Refinery Runs

Jersey affiliates' refineries averaged 1,390,000 bbl. daily in processing of crude oil during the year. Domestic plants, and plants outside the United States, increased their throughput by more than 6 per cent. Crude runs of affiliated companies in the United States represented about 13 per cent of the domestic-industry total, and those of foreign affiliates about 19 per cent of the industry total outside this country *(See page 153, this issue)*. The wholly owned affiliate, Esso Standard Oil Co., which refines and markets in the eastern and southeastern parts of the United States, raised its total output of products to a new high level, and made important additions to its refineries. Other units in its construction program will be completed this year.

The new refinery of Carter Oil Co. (another wholly owned subsidiary) being erected at Billings, Mont., was about 60 per cent completed by the end of the year, and, in view of the fact this modern plant will soon be in operation, the old refineries at Lovell and Newcastle, Wyo., were sold.

Expansion and modernization program of the Montreal refinery of Imperial Oil, Ltd., under way since 1946, was completed. First phase of Imperial's new refinery project at Edmonton was completed with moving of the Whitehorse refinery by rail, sea, and the Alaska Highway, and its re-erection in position to serve Leduc field.

Jersey's pipe-line affiliates in the United States increased movements 12 per cent over 1947, and pipe-line capacities were increased abroad. In December 1948 oil started through Creole Petroleum Corp.'s 24 and 26-in. crude-oil line from Lake Maracaibo to Amuay Bay in Venezuela. The 145-mile line delivered initially 150,000 bbl. a day, and when a second pumping station is completed, capacity will be increased to 325,000 bbl. daily.

Standard Oil Development Co., Jersey's central research and development organization, opened its new Esso Research Center in Linden, N. J., in October 1948. Also, substantial additions to Carter Oil Co.'s Tulsa research laboratories were completed during the year. Expenditures for research and development totaled $20,200,000, about 11 per cent more than in the previous year. Improvements in the fluid catalytic cracking process continued, and accumulated effect of these improvements now makes it possible for the company to hold cost of building these units to about the level existing at time of their commercial introduction in 1942, despite an increase of almost 65 per cent in construction.

Total income in 1948 was $3,332,187,000, an increase of 40 per cent over 1947. Net earnings of the parent company for the year were $155,923,000, equal to $5.31 per share.

Annual Reports

The Journal here continues giving the 1948 operating highlights of oil and gas companies as revealed in their annual reports. Additional summaries will appear in future issues.

New Sales Records Set By Richfield Oil Corp.

NEW sales records for gasoline, lubricating oil, diesel fuel oil, and heating oil were established during 1948, according to the annual report of Richfield Oil Corp.

Another company highlight during the year was discovery of oil in the Cuyama Valley in California, opening up a new region for oil exploration The company now has 60 producing wells in the area and is currently drilling 8 others. Richfield holds under lease or contract approximately 92,206 acres of land in the area and has options on 65,696 additional acres.

Two other important discoveries were made during the year in Coal Oil Canyon field and in Paloma field, both in Kern County, California.

During 1948 the company had a net crude-oil production of 9,071,795 bbl.

(Continued on page 183)

Antitrust Investigation In California Continuing

WASHINGTON. — The grand-jury investigation of the California oil industry is still continuing, but Department of Justice officials in Washington said informally this week that no new developments have been reported recently.

The matter is being handled independently by the West Coast office of the antitrust division, and only occasional reports are being received in the department.

It is understood that some attention is being paid to production, although there is some doubt whether the department could do anything about it in view of the fact that something like 99 per cent of California output is refined within the state and presents no angle of interstate commerce.

The situation with respect to refined products, of course, is different, since a large volume of them enter into interstate commerce.

It is pointed out that for more than 20 years the California producers have been more or less controlling their output to encourage conservation, without any change in the department's position.

Observers who followed the proceedings in the lower courts and the argument before the Supreme Court have commented on the fact that Standard Oil Co. of California at no time raised objection against the department's charges with respect to leases and contracts with California service stations, where they said the company might have contended that the whole matter was intrastate and therefore not within the scope of Justice Department jurisdiction. Such a position, however, they admitted, would not have been tenable with respect to station relations in the other West Coast states to which products were shipped from California.

Bill Would Free Royalty Oil From Premium Prices

WASHINGTON.—Collection of premium payments for government royalty oil from small independent refiners who entered into purchase contracts under the O'Mahoney act of 1946 would be barred, as from February 1, last, under legislation introduced in Congress by Sen. Edwin C. Johnson of Colorado.

Under the O'Mahoney act, independent refiners unable to secure adequate supplies of crude were given a preference to purchase government royalty oil and a number of purchase contracts were entered into, under which they were required to pay a premium over the market price of the oil. Some months ago, as a result of protests that the Government was trying, on the one hand, to check the upward price spiral and, on the other, was contributing to it by offering its royalty oil to the highest bidder above the posted price, the Interior Department abandoned the auction system but maintained that agreements previously entered into must be completed.

Recently a large number of royalty-oil purchasers have complained that the premiums required under their contracts had become an onerous burden, but department officials pointed out there was nothing they could do under the law to afford relief.

The Johnson bill provides that no premium payments now required to be made under existing contracts shall hereafter be paid and that any such payments made since February 1 shall be credited to the account of the paying refiner and applied in payment of royalty oil.

Muskat Reservoir Lectures To Be Repeated at U. of K.

A series of six lectures on petroleum reservoir engineering will be given at the University of Kansas, Lawrence, May 6-8 by Dr. Morris Muskat, chief of the physics department of Gulf Research & Development Co., Pittsburgh.

The lectures are designed to give engineers a comprehensive review and better understanding of reservoir performance, and cover relative permeabilities, condensate reservoirs, gas-drive performance, gas injection, water-injection well histories, and partial water drives. *(Summaries of similar lectures given by Muskat at University of Texas appeared in The Oil and Gas Journal February 17 and 24, March 3, 10, and 31, and April 7).*

Elk Hills Naval Reserve Extended by Government

WASHINGTON. — President Truman has issued an executive order extending the limits of Naval Petroleum Reserve No. 1 (Elk Hills, California) to take in territory sought by the Navy as a result of drilling designed to determine the limits of the structure.

The order is a modification of one issued April 1, 1948, extending the reserve by 2,480 acres, later amended by an order of December 30, 1948, eliminating 320 acres held under leases on which the lessees had expended considerable money and were felt by the Interior Department to deserve a renewal of lease to give them a chance to get back the costs of previous drilling, which had resulted only in dry holes.

Another 80 acres comprising the north half of the northwest quarter of Section 14 T 31S, R 24E, is eliminated under the most recent order, and 200 acres owned by Standard Oil Co. of California is included and brought under the unit-operation contract. The order increases the area of the reserve by 2,280 acres, all but Standard's 200 acres being government land.

Next Week

A special "symposium" on secondard-recovery operations will be included along with articles on refining, natural gas, drilling, and production subjects. Covered in the symposium will be:

Results of Gas Injection in Dolomite Reservoir.—Fred J. Neslage, project manager for West Pampa Repressuring Association, gives data for this 1,000-well, 11,800-acre project.

Fallacy in Five-Spot Operation?—The "question mark" here pertains to the most desirable location of injection wells, especially considering areal sand conditions (in five-spot or other "pattern" projects, these conditions cannot be recognized).

Larimore Field, Young County, Texas.—Marvin A. Remke, engineer with Phillips Petroleum Co., tells of pool conditions, core data, estimated recovery under gas repressuring.

and

Ranney Horizontal Well System.—Leo Ranney, famed inventor of what has been called "first really new idea in well design since man sank his first shaft," describes application of this system for furnishing water supplies in large quantities. Construction details and some actual installations are discussed.

Pipe Stress Analysis for Thermal Expansion.—Simon W. Lewaren, Chicago, discusses subject from design standpoint for pipe-line system, petroleum refineries, and other processing plants where high temperatures are encountered.

"Stock Pile" Natural Gas?—Very interesting development which involves the use of solvent adsorbents for the storage of natural gas; presented by C. V. Spangler of J. F. Pritchard & Co.'s Pittsburgh office.

Sodium Silicate in Drilling Mud?—Use of this chemical in the control of heaving shale problem in the Gulf Coast area is described by William V. Vietti, chief petroleum engineer for The Texas Co., Houston.

PERSONALS

Kinsolving Is Head of New Pipe-Line Company

WILLIAM C. KINSOLVING, widely known pipe-line executive, has been named president of the newly organized Mid-Valley Pipeline Co., which was formed by Sun Oil Co. and Standard Oil Co. (Ohio). In addition to the new company, Kinsolving also heads two other pipe-line systems, Sun Pipe Line Co. (Texas), with 405 miles of gathering, and 663 miles of trunk lines, and Susquehanna Pipe Line Co., consisting of 853 miles of products pipe-line system.

Kinsolving, a native of Corsicana, Tex., joined Sun Oil Co. as an oil-field worker after receiving a degree in electrical engineering from Cornell University in 1923. He advanced through various stages of oil-field work, until he was placed in charge of construction of the Susquehanna products pipe line, from Marcus Hook, Pa., to Cleveland in 1930-31. Returning to Texas, he directed construction and operation of Sun's pipe line from the newly discovered East Texas oil field, to the Gulf Coast.

In 1942 Kinsolving was called to Washington to serve as assistant director of transportation for the Petroleum Administration for War. In that capacity he played a prominent role in the planning and construction of the war-emergency 1,300-mile "Big Inch" pipe line from Texas to Philadelphia and New York.

Later commissioned a colonel in the Army Corps of Engineers, Kinsolving played a major role in building of the China-Burma-India pipe line. Upon completion of his war service in India, he became chief engineer of the Susquehanna pipe-line operations. In July 1947 he was elected president of Sun Pipe Line Co. (Texas) and also of Susquehanna Pipe Line Co.

Joiner Cartwright, Beaumont, Tex., has been elected assistant secretary of Sun Oil Co. A member of the Management Committee, Gulf Coast division, Sun's production department, Cartwright joined the company's legal department immediately after graduation from University of Texas Law School in 1924. He has been general attorney of the Gulf Coast division since 1942.

F. T. Baldwin, assistant general attorney for The Texas Co., Houston, has been named president for 1950 of the "Texaco Oldtimers Club of Houston" at its annual meeting last week. Vice presidents named for the coming year were: **J. W. Emison, A. R. Wilson,** and **J. W. Hicks. Miss Frances H. Mackenzie** was named secretary and **J. M. Cire,** treasurer.

T. I. Clausen, assistant to the manager, chemicals division, California Research Corp., has been transferred to Oronite Chemical Corp. Both are Standard Oil Co. of California subsidiaries. Clausen will make his headquarters in New Orleans as general superintendent in charge of manufacturing operations at Oronite's Oak Point plant.

P. N. Gammelgard, operations manager, refinery-operating division, Pure Oil Co., Chicago, has been appointed commanding officer of the volunteer Petroleum Reserve Unit, for the Ninth Naval District, succeeding **George H. Schulz,** vice president and treasurer, American Mineral Spirits Co., Chicago, who organized the group. **Charles R. Haddon** of Socony-Vacuum Oil Co., Inc., has been appointed executive officer for the unit.

J. R. Foster has been made a party chief of a Stanolind Oil & Gas Co. seismograph party at Minden, La. Foster has been working on a special interpretative problem at Stanolind's division office in Fort Worth. **G. F. Obenhaus,** field engineer for Stanolind at High Island, Tex., has been transferred to the Beaumont district office. **J. W. Lord,** field engineer at Bishop, will succeed Obenhaus at High Island. Replacing Lord at Bishop will be **T. C. Storer,** petroleum engineer at Alvin, Tex. **W. C. Wilhite,** field engineer, Hackberry, La., has been transferred to the Lake Charles, La., district office, and will be succeeded by **J. A. Couvillon,** who has been at the Lake Charles office.

Cliff Mowry, Standard Oil Co. of Texas, Farmington, N. M., has been moved to San Angelo, Tex., to serve as scout for the company. He formerly was with American Republics Corp. **Fred Jones,** also a scout for Texas Standard, replaces Mowry at Farmington.

Elmer C. Simpson, who retired from Magnolia Petroleum Co. in 1948 after 30 years of service, has been named an inspector of the oil and gas division, Texas Railroad Commission, stationed at San Angelo. He formerly was located in Midland, Tex.

R. L. WAGNER

R. L. Wagner, who on February 1 was named general counsel for Great Lakes Pipe Line Co., Kansas City, Mo., has been elected a director of the company, along with **J. B. Lawson,** vice president of operations. Wagner was with Shell Oil Co., Inc., for 2 years as assistant manager of that company's legal department before joining Great Lakes Pipe Line. He moved from New York City to Kansas City when he joined the firm last February.

Dr. Horace D. Thomas, Wyoming State geologist, addressed the Houston Geological Society last week on the regional stratigraphy and structure of Wyoming.

Albert Finston and **Arthur Finston** have announced reopening of the firm of Finston & Co., to engage in exploration for, and acquisition of petroleum and natural-gas producing properties. The firm, located in the Mayo Building in Tulsa, was closed at the beginning of World War II, when the two Finstons entered the Armed Service.

J. Don Weir, superintendent of the exploration department in Canada, of California Standard Co., has been elected vice president in charge of exploration for the company. He has been associated with Cal-Standard for several years.

At a meeting of the board of directors of Lion Oil Co. the following officers were elected: **T. H. Barton,** chairman of the board; **T. M. Martin,** president; **A. F. Reed,** vice president; **J. E. Howell,** vice president; **R. E. Meinert,** vice president; **C. N. Barton,** vice president; **Jeff**

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PERSONALS

Davis, secretary; **E. W. Atkinson,** treasurer; **E. P. Marrable,** assistant secretary and assistant treasurer; and **B. L. Allen,** assistant secretary.

John C. Hogan, veteran marketing executive, has been appointed assistant to the president of Mid-South Oil Co., Memphis. He formerly was with Pure Oil Co. for 26 years, much of that time being spent in connection with that firm's southern operations. His brother, the late J. Phillip Hogan, had been secretary-treasurer of Mid-South Oil for several years.

Eugene M. Solow, Dallas, has resigned as vice president of Western Supply Co. to continue as an independent operator. Solow owns production in East Texas, West Texas, and the Texas Panhandle, and present plans are to expand his holdings in those areas. He has been associated with Western Supply for the past 20 years and is well known in natural gasoline, producing, and equipment circles.

J. Ben Whittenburg, Jr., formerly stationed in the sales department in Midland and other West Texas cities for Humble Oil & Refining Co., has been appointed district sales manager for the company's nine-county Beaumont district.

L. S. Reed, president, and **Gordon W. Reed,** chairman of the board of Texas Gulf Producing Co., Houston, have been reelected to their respective positions.

Charles Behnen and **Frank J. Phee,** recently of the Arrow Petroleum Co., have organized the Centralia Petroleum Co. for wholesale petroleum marketing in the Centralia, Ill., region. Behnen was sales manager for Arrow, while Phee served as refinery manager.

Officers elected at the recent meeting of Southern Gas Association, in Biloxi, Miss., included the following: **Leonard L. Baxter,** president, Arkansas Western Gas Co., Fayetteville, Ark., president; **Lyman L. Dyer,** controller, Lone Star Gas Co., Dallas, second vice president; and **H. V. McConkey,** treasurer, Southern Union Gas Co., Dallas, treasurer. **Floyd L. Carmichall,** manager of Lone Star Gas Co.'s Fort Worth division, and **H. C. Frizzell,** president, Texas Southeastern Gas Co., Bellville, were named directors of the association.

Wallace T. Holliday, president of Standard Oil Co. (Ohio), who was named by the American Petroleum Institute to represent the oil industry on the board of the Brand Names Foundation, has been reelected vice president of the group's board.

C. L. Kluck, sales manager of Shell Oil Co.'s Baltimore marketing division, has been named to a similar post in the company's Indianapolis division. He succeeds **E. H. Cain,** who has been transferred to the New York office as assistant manager of the retail department.

Harold C. Bishop was recently elected president of Crystal Oil Refining Co. **Sidney P. Clark** was named vice president.

D. A. Hulcy, president of Lone Star Gas Co., has received the 1948 Linz award for outstanding community service to the city of Dallas during the past year.

Sam Levine has transferred from the research and development department of Atlantic Refining Co. in Dallas to the company's research staff in Philadelphia.

V. E. Cloer has joined the staff of the Refinery Division of Cities Service Oil Co. at Bartlesville, Okla., as a chemical engineer.

Ralph W. Collins, Tulsa, has been named division engineer for Stanolind Oil & Gas Co.'s North Texas-New Mexico area, and **C. L. Kelley,** senior petroleum engineer in the Fort Worth division office, has been named assistant field superintendent at Brownfield, Tex. Collins joined Stanolind as a roustabout at Midwest, Wyo., in 1936. He worked in several Rocky Mountain fields, and at the company's Casper, Wyo., division office, before going to Rangely, Colo., as production foreman in January 1947. A year later he went to the Tulsa general office as a petroleum engineer, and in January of this year was made a senior petroleum engineer in Tulsa. He has a B.S. degree in mechanical engineering from University of Colorado. Kelley started with Stanolind in 1937 at Iraan, Tex. He spent several years working in West Texas fields before being made a petroleum engineer in East Texas in 1943. He went to Odessa, Tex., as field engineer in 1945, becoming production foreman there 17 months later. Early in 1948 Kelley became a senior petroleum engineer at the Fort Worth division office. He has a B.S. degree in petroleum-production engineering from Texas Technological College.

Elmer F. Blake, formerly with Western Geophysical Co., has joined the supervisory staff of Southern Geophysical Co., Fort Worth. He formerly was a party chief for Western Geophysical in the Rocky Mountain area.

Don Emery, Bartlesville, Okla., vice president and general counsel for Phillips Petroleum Co., has been elected president of the board of regents of University of Oklahoma, Norman. He is a graduate of the university, receiving his B.A. degree in 1920, and an LL.B. degree in 1921. Emery has been head of the legal staff of Phillips Petroleum Co. since 1938.

D. R. Howgill, Middle East chief engineer for the Shell organization since 1945, with headquarters in Cairo, has been appointed to a new position in Shell's London office. Howgill joined Shell in 1928 and has had wide experience in oil operations in the Far East, as well as the Middle East.

Lysander T. White, of Petroleum Advisers, Inc., New York City, has been named by Secretary Charles Sawyer as a member of the Commerce Department's small business advisory committee, organized in 1945 to advise the secretary on the problems of small business. The committee is holding a 3-day session in Washington this week.

Frank Ittner, has been appointed manager of exploration for the Pacific division of the Superior Oil Co. to direct all geological, geophysical, and land matters connected with exploration.

George B. Sandel, formerly a member of the legal department of the Stanolind Oil & Gas Co., has joined the legal staff of the Stanolind Pipe Line Co. He is a law graduate of the University of Tulsa evening college.

At a recent dinner meeting held in honor of long-time employes of Cities Service Gas Co., **S. B. Irelan,** president of the company, awarded emblems of service to the following: **Frank D. Renfro,** and **J. F. Clarking,** 40-year pins; **E. E. Lambe** and **J. F. Solomon,** retired, 35-year pins; **J. R. Ferris,** retired, 30-year pin; and **Miss Clay Coleman,** retired, a 25-year pin. Meeting was held at the Duncan Hotel in Pawhuska, Okla.

John S. Carlson, general counsel and secretary of Seismograph Service Corp., Tulsa, for the past 7 years, has opened offices in the McBirney Building for general practice of law. He will continue as general counsel for Seismograph Service, but on May 2 will resign as that firm's secretary.

Dr. Charles L. Smith, formerly with National Agricultural Chemicals Association, has joined the staff of product-development department, Ethyl Corp.

Harold E. Bryson has been appointed manager of a newly created department for sale of waxes and related products, of Sinclair Refining Co. **E. P. Shipely** has been appointed manager of bulk lubricating sales in the New York office, succeeding Bryson.

Edward O'Herron, Jr., Charlotte, N. C., was elected a director of Wilcox Oil Co., to succeed his father who resigned, at a recent annual meeting held in Tulsa. All other directors were reelected.

Four new directors have been added to the board of Shell Union Oil Corp., New York City. They are: **Cason J. Callaway, Stanley W. Duhig, H. Bloemgarten,** and **J. W. Boyle.**

E. C. Pritz has been appointed assistant to the traffic manager of Standard Oil Co. (Indiana). He joined the company in 1916 as a traffic analyst in the Joliet, Ill., sales office. Later transferring to the traffic department in Chicago, he advanced through the rate division to become a general supervisor in the department.

W. F. Schafer, formerly district superintendent for Pure Oil Co.'s Cumberland district in Oklahoma, has been transferred to Midland, Tex., as West Texas superintendent of production.

George J. O'Brien, vice president of Standard Oil Co. of California, has been named chairman of the 1949 Community Chest campaign in the Los Angeles metropolitan area.

Raymond B. Hamilton, manager, Shreveport district, State Conservation Department, has been appointed a member of the secondary recovery advisory committee of Interstate Oil Compact Commission.

SHIFTS—

John C. Reidel, contractor, Bechtel Corp., Oakland, Calif., to Tulsa; **Milton D. Buie,** engineer, Texas Eastern Transmission Corp., Longview, Tex., to Little Rock, Ark.; **Glenn H. Pickett,** superintendent, Guy Mabee Drilling Co., Odessa to Plains, Tex.; **M. H. Anderson,** engineer, Phillips Petroleum Co., Pampa to Phillips, Tex.; **Clyde R. Haupt,** foreman, Acme Drilling Co., Westfield to Coudersport, Pa.; **M. J. Lebsack,** engineer, Pioneer Oil Corp., Rock Springs, Wyo., to Silver Spring, Md. **Joe J. Kluck,** foreman, Samedan Oil Corp., Lone Grove to Velma, Okla.; **C. D. Gold,** superintendent, Bruin Oil Corp., Tulsa to Bristow; **George M. Dorwart,** foreman, Union Oil Co. of California, Whittier to Bakersfield, Calif.;

Arthur T. Guernsey, engineer, Shell Oil Co., Inc., Hobbs, N. M., to McCamey, Tex.; **A. J. Shaw,** engineer, Humble Oil & Refining Co., Florey to Odessa, Tex.; **F. F. Owings, Jr.,** foreman, National Geophysical Co., Sterling City to Lamesa, Tex.; **Victor Bychok,** foreman, Atlantic Refining Co., Big Lake to Rankin, Tex.; **Herbert Henderson, Jr.,** engineer, Stanolind Oil & Gas Co., Levelland, Tex., to Ulysses, Kans.; **E. L. Chapin,** foreman, Stanolind Oil & Gas Co., Odessa to Lubbock, Tex.; **Bruce Echo Hawk,** foreman, Century Geophysical Corp., Olney to Haskell, Tex.; **Homer E. Roberts,** geologist, Petty Geophysical Co., San Antonio to Post, Tex.; **T. Rozsa,** geologist, Shell Oil Co. of Canada, Ltd., Baton Rouge, La., to Calgary, Alta., Canada.

N. F. Williams, geologist, Arkansas Resources & Development Commission, Bauxite to Little Rock, Ark.; **R. L. Dacey,** geologist, Humble Oil & Refining Co., Columbia, Miss., to New Orleans, La.; **R. T. Widney,** engineer, Cities Service Oil Co., Bartlesville, Okla., to Hutchinson, Kans.; **E. N. Mitchell,** superintendent, Rocky Mountain Drilling Co., Ventura, Calif., to Los Angeles; **Mack Calvin Murray,** engineer, Pan American Production Co., Dickinson, Tex., to Houston; **E. J. Kieth,** foreman, Continental Oil Co., Pampa to Quanah, Tex.; **Marshall R. Pullen,** engineer, Hunt Oil Co., Haynesville to Shreveport, La.; **Hugh O. Meeks,** engineer, Great Lakes Carbon Corp., Chicago to Ponca City, Okla.

DEATHS

Dr. Joseph A. Cushman, 68, Sharon, Mass., noted geologist, died April 16 in Sharon. He was a consulting geologist of the U. S. Geological Survey, and had been director of Cushman Laboratory for Foraminiferal Research since 1923.

Curtis Hertig, 63, former associate of the old Eastland Gas Co., Eastland, Tex., died April 17 in Eastland.

Archibald McIntyre Maxwell, 54, Cleveland, first vice president, Standard Oil Co. (Ohio), died April 18 in Cleveland. He had been associated with the company since his graduation from Cornell University.

William A. Monce, 67, former oil driller, died in Electra, Tex., April 18.

Richard R. Crandall, 47, consulting geologist, Pasadena, Calif., died in Pasadena April 16. He formerly was associated with General Petroleum Corp. and The Texas Co.

Harry N. Benear, 77, veteran oil man formerly associated with the Marland Oil Co., died April 15 in Tulsa.

Samuel L. Arledge, 55, auditor for The Texas Co. for more than 28 years, died April 15 in Caracas, Venezuela.

Harrison O. Parsons, 69, superintendent of equipment in the traffic department for Humble Oil & Refining Co. until his retirement in 1944, died April 18 in Houston.

John P. Shannon, 57, manager of the package department office of Bayonne (N. J.) refinery, Esso Standard Oil Co., died April 20 in Elizabeth, N. J.

William Bertie Irvine, 55, a department supervisor at the Bayway refinery of Esso Standard Oil Co., in Linden, N. J., died April 20 at Kenilworth, N. J.

Clyde Whitehead, Pittsburgh oil operator and well known in West Texas areas, died in Pittsburgh, April 18.

A. B. Bauchman, independent oil operator of Seguin, Tex., died April 21 in Seguin.

Leonard C. Sleep, 51, Allegan, Mich., oil operator, died April 14 in Allegan.

J. W. Burgess, Tulsa independent oil man, died in Tulsa April 18. In 1914 he and his associates drilled several producing wells on the Berryhill property in Red Fork, Okla.

WEST BURKBURNETT FIELD

Water-Flood Project

will be largest pattern project in North Texas

by H. K. Holland, Jr.*

RECOVERY of oil by water flooding is practiced more extensively in North Texas than in any other section of the state. The large number of stripper wells in the area has stimulated the development of water-flood projects. However, the small size of many of the fields and the thin oil-producing sands in most areas has presented numerous economic and technical problems.

*District petroleum engineer, Magnolia Petroleum Co., Electra, Tex. Summarization of paper presented at Petroleum Recovery Conference, Texas Petroleum Research Committee, A. & M. College of Texas, College Station, April 6-8.

West Burkburnett field is one of the larger shallow fields in North Texas and is located approximately 2 miles southwest of Burkburnett in the Red River Valley Land Subdivision, Wichita County, Texas. It is part of what was formerly known as Old Burkburnett field, but is a separate reservoir from the numerous producing sands originally designated as that field.

Geology

The tectonic elements which seem to have controlled the accumulation of oil in this area is the Red River uplift. This is described by geologists as being a chain of dissected Cambro-Ordovician limestones and granite hills.

Most of the sands in this area are known by depth in the respective fields in which they are found. The sand found in West Burkburnett field from approximately 1,600 to 1,850 ft. belongs to the Cisco series of Pennsylvanian age. The sand is designated by geologists as the Gunsight sand.

The structure of the Gunsight sand in the area to be water flooded is lenticular. The major axis of the lens runs east and west, and the sand dips approximately 250 ft. from the south to the north in the field. The sand is broken or interspersed with shale, a characteristic of many of the oil producing sands in North Texas. The sand

Detail map of water-flood project (this area is located 2 miles southwest of Burkburnett, Wichita County, Texas)

lenses into shale on all sides of the field.

Limits of the field have been defined by the wells drilled during the original development. The field was originally drilled on approximately 10-acre spacing, although many of the inside locations were never drilled. Since the sand is interspersed with shale, it is difficult to determine the net sand thickness unless the sand is cored and analyzed.

Properties of the Reservoir

There is no evidence of a water table or water drive in the field, and it is believed that the small amount of water produced from some of the wells is due to casing leaks or defective casing seats. It is assumed that the reservoir is of the solution gas drive type, and that the original oil in the reservoir was undersaturated. No data is available on original bottom hole pressures or gas-oil ratios; however, they were probably very low. It is the opinion of the author that the pulling of vacuum, gas injection, and gravity drainage accounts for the relatively long life of production.

Permeability data were obtained on various core samples by passing air and various salinities of water through the core samples. Using the permeability to air as a 100 per cent base (34.5 md.), the permeability to water decreased as the chloride content was reduced. The average permeability to water containing 100,000 p.p.m. of chlorides was 73.3 per cent (25.3 md.) of the average permeability to air; whereas, the average permeability to fresh water was 30.1 per cent (10.4 md.) of the average permeability to air.

After fresh water had been passed through the core samples, the average permeability to water containing 100,000 p.p.m. of chlorides was 30.1 per cent (10.4 md.). The results obtained from these tests indicate that a higher permeability to input water would be obtained by the use of salt water; and that once fresh water had passed through the sand, the permeability to salt water could not be restored.

Core analyses were obtained on the core samples taken from wells drilled in 1943 and 1944, and the properties of the reservoir presented in this paper are based on the data obtained. Two methods were used to obtain cores of the wells drilled. Approximately one-half of the cores were taken with rotary tools using a high-water-loss mud. The cores were flushed and the oil-saturation data obtained were assumed to be indicative of the residual-oil saturation after the sand has been flooded with water.

One-half of the cores were taken with cable tools using produced oil as the drilling fluid. The water-saturation data obtained by this procedure were assumed to be the interstitial water in the sand. Cores having very low permeability or excessive water saturation were assumed to be nonproductive.

Since the sand is interspersed with shale, the thickness as shown on the original driller's logs does not reflect the net sand thickness, so core analysis reports were used to estimate the net sand thickness. The recoveries to date on the various leases is also indicative of the net sand thickness. The reservoir properties obtained from core analysis and production data are as follows:

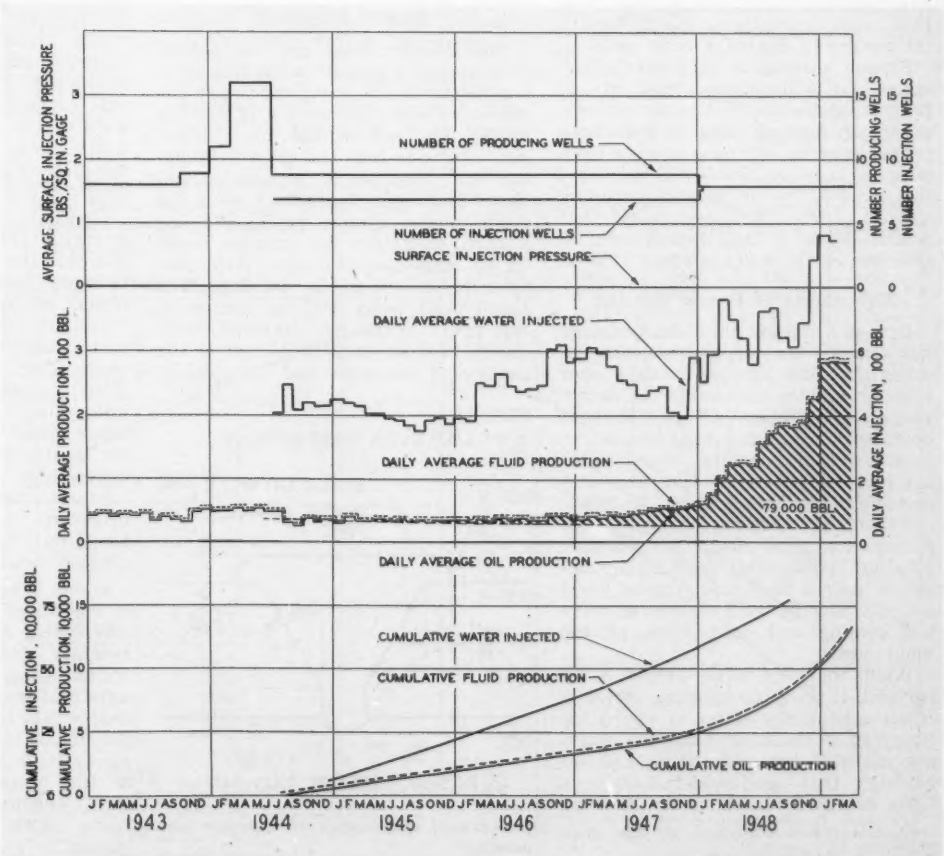
Porosity, per cent volume	23.0
Permeability, md.	72.0
Interstitial water saturation, per cent pore space	23.0
Residual-oil saturation after flood, per cent pore space	26.0
Estimated original formation volume factor	1.06
Estimated present formation volume factor	1.00
Oil viscosity, cp.	4.00
Oil gravity, A.P.I. at 60° F.	39.5

Pilot Water-Flood Project

Water injection was started on a 160-acre lease in July 1944 with seven water input wells and nine producing wells. This lease is located in the northeast part of the field. There are 138 acres within the effective water-flood limits.

The 160 original productive acres have been reduced to 138 effective water-flood acres since no offset water-input wells will be drilled to the north of the lease. The lease was drilled on 10-acre spacing, and the water flood was developed on a 20-acre five-spot pattern. The average

(Continued on page 123)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Production history (Gunsight sand) for Magnolia Petroleum Co.'s J. G. Goins lease water-flood project. Data are: porosity 23.0 per cent; interstitial water saturation 23.0 per cent; residual-oil saturation after flood 26.0 per cent; present formation volume factor 1.00; oil viscosity 4.00 cp.; oil gravity 39.5° A.P.I.; productive lease, 160 acres; water flood, 138 acres; permeability 72 md.; primary recovery 4,011 bbl. per acre; injection pattern, five-spot; spacing, 10-acre

S-P-A-C-I-N-G

in pipe-line welding

by L. J. Cunningham*

In this article the author, who is assistant superintendent of pipe lines for Northern Natural Gas Co., outlines his company's policy on acceptance of improved welding procedures in pipe-line construction. Details on current procedures are also discussed.

A CONTINUOUS program of making experimental test welds is routine with Northern Natural Gas Co. We are not too satisfied with our own ideas, which accounts for the ever-present necessity for test welds to prove or disprove the various notions of just what it takes to make a high-quality weld. We will incorporate into our welded pipe lines the ideas and suggestions from any one if, after making experimental test welds, they prove to be an improvement in the technique and quality of welding on our pipe lines and over our present specifications.

We believe our record of no interruptions in service due to weld failure on pipe lines laid since 1939 is largely due to the precautions used in selecting welders together with what we think are the proper specifications for making welds of the best quality. We insist upon rigid but helpful inspection on all welded lines, giving special care to the inspection of line-ups and stringer beads since these two items are determining factors in the quality of the weld to be made.

Proper spacing is of great importance and will increase the rate of progress unless carried to an extreme width. In making tests to determine proper spacing, we have started from no space between bevels and increased this by 1/32 in. up to and including a ⅛-in. space. We have found that 3/32-in. space is ideal before tacking, after which the space is about 1/16 in.

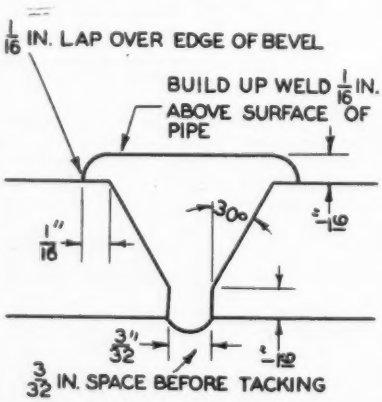
Advantages of Proper Spacing

It is my opinion that close spacing has exacted its toll in progress because of broken stringer beads. Proper spacing enables the welder to obtain proper penetration of the stringer bead with minimum heat regulation on the welding machine. Proper spacing also allows for cooling and contracting of the metal deposit. We have condemned welds because of poor penetration as a result of improper spacing. These welds had actually upset or bulged the inside edge of bevel by the terrific pull resulting from the cooling and contraction of the weld metal.

When the joint to be welded is set up with little or no spacing, which is often mistakenly done to speed up progress of the pipe gang, the welding machine heat regulation was set so high that the welder had very little control over the metal deposit, with the result that the stringer bead is nothing more than a blister or an oxidized crust with just an occasional 10 per cent penetration. The welder attempts to push the rod into the stringer bead and by the time half of the rod is burned, the coating is blazing on the remaining half which destroys the effectiveness of the coating and defeats its purpose. With proper spacing, the heat setting on the welding machine would be much lower and the welder would not be riding and pushing on the welding rod and throwing away one-half to three-fourths of it. He should be applying a gentle and constant even pressure, obtaining 100 per cent penetration plus a uniform stringer bead and burning the welding rod to within 2 in. or even closer to the electrode holder. This would be done in less time than it required to go through all the motions described earlier with the high heat regulation and close spacing.

Size of Electrode

The stringer bead and the second pass should be made with the same size electrode. We continue to use the same size electrode until it is possible to lay the end of the next larger size electrode into the groove touching the weld metal previously deposited without contacting with the sides of the groove or V. We use 5/32-in. electrodes for stringer beads on all large-diameter pipe. After the filler beads are made, we apply the finish bead, using 3/16-in. electrodes. We insist upon the finished weld being built up to 1/16 in. above the surface of the pipe, and in width it must extend or lap over the outside of the V not more than 1/16 in. on each side. This makes a neat, narrow weld, which in tests that we have made has proved to be preferable to wide welds in that by making a narrow weld we evade in part the effects of locked-in stresses and strains brought about by the prolonged burning and heating period required to make the large, wide weld-metal deposit.



Dimensional specification on pipe-line joint welding

Also, in the narrow weld, we find fewer slag inclusions, and I think I should mention that all of our welding is done by the downhill method. We have proved by laboratory tests that downhill welding is slightly better than the uphill method. We find a higher refinement in grain structure along with suitable ductility and higher tensile strength in welds made by the downhill method.

The method means just what the name implies. The weld is started on top of the pipe and is finished on the bottom. The trend has been toward higher carbon content and higher manganese, and if this is continued, some form of preheating will be required for each and every weld that is made in a pipe line. This would be a heavy expense added to the already all-time high of pipe-line construction expenses.

One of the difficulties that is worrying pipe-line contractors at the present time is the breaking of stringer beads. In numerous tests which we have recently made, we found that Shield Arc No. 85 would crystallize when used for stringer beads. Then we found that if we applied the second pass immediately after the stringer bead it would bring about or cause a refinement in the grain structure of the stringer bead metal thereby overcoming the crystallization. We have tried this procedure on one of our recent construction jobs and eliminated broken stringer beads or breaks in any weld.

Some have resorted to a mixture of electrodes such as Fleetweld No. 5 and Shield Arc No. 85. We have just recently completed a series of test welds, using every thinkable combination of mixtures of these two electrodes. We have never recommended the use of mixed electrode welds nor do we have any intention of doing so at the present time. After making these exhaustive tests, we find that there is little, if anything, to be gained by doing so.

*Assistant superintendent of pipe lines, Northern Natural Gas Co.

PRACTICAL USE OF Bottom-Hole-Pressure Buildup Curves

by J. J. Arps* and A. E. Smith*

WHEN a producing well is shut in, the pressure in the well bore opposite the producing formation will generally begin to rise, rapidly at first, and gradually slower later on until finally a maximum is reached. This maximum is commonly called the static bottom-hole pressure and will be reached when the pressure in the well bore is in equilibrium with the pressure in the surrounding formation. Knowledge of this static bottom-hole pressure is essential in reservoir-engineering work, and these pressures are also used to a great extent for reserve estimates and proration purposes.

Unless the productive index is relatively high, it is not always feasible or practical to shut a well in long enough to allow the pressure to reach equilibrium. In such cases, the static bottom-hole pressure must be calculated or estimated from a series of pressure observations during the allotted shutdown time. It is obvious that, if this can be done in a simple and reliable way, the shutdown time may be considerably shortened and appreciable savings made in downtime and lost production.

The bottom-hole-pressure data obtained during the buildup period can be utilized to arrive at the static bottom-hole pressure by various extrapolation methods, some of which are well known from earlier publication[1,2] on this subject, and will therefore only be briefly reviewed, together with the mathematical background.

*British - American Oil Producing Co., Tulsa. Summarization of paper presented at the spring meeting of the A.P.I. Mid-Continent district, Division of Production, Tulsa, March 23-25, 1949.

Equations for Pressure Buildup

Based on Darcy's law, the rate of influx into the well bore (or its equivalent in pressure buildup per unit of time) will be proportional to the difference between the static bottom-hole pressure P_s and the producing bottom-hole pressure P, or:

$$dP/dt = c\,(P_s - P) \qquad (1)$$

in which c represents the productivity factor or the pressure buildup in pounds per square inch per hour per pounds per square inch differential between P_s and P. This differential Equation 1 can be converted to the following form for integration:

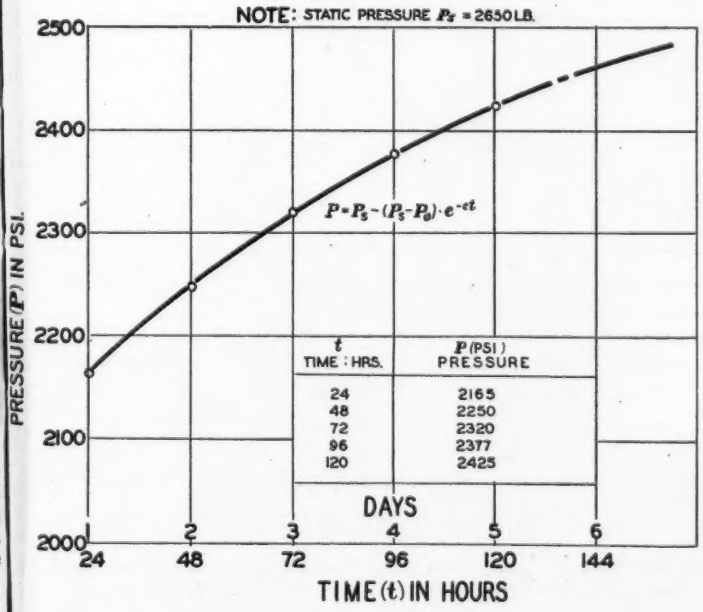
$$\frac{dP}{P_s - P} = c\,dt \qquad (2)$$

After integration and elimination of the integration constant by setting P equal P_o for t equal 0, it is found that:

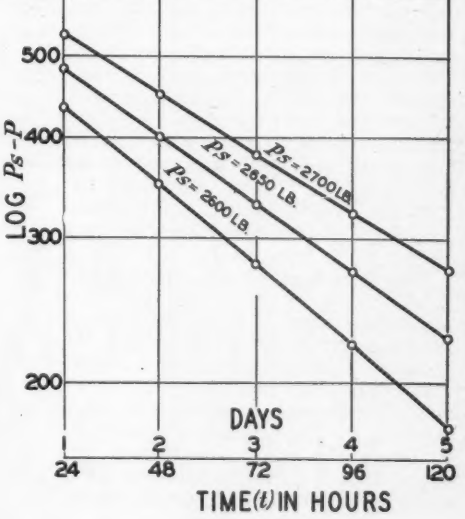
$$\log_e (P_s - P) = \log_e (P_s - P_o) - ct \qquad (3)$$

from which the general pressure

Fig. 1—(Below) This curve illustrates the bottom-hole-pressure buildup curve for a low-productivity-index well in South Texas. Fig. 2—(Right) The procedure involved in using the semilog extrapolation method for predicting static pressure in this well



SHUT IN TIME : HRS.	PRESSURE P IN PSI	$P_s - P$ FOR P_s = 2700 PSI	2600 PSI	2650 PSI
24	2165	535	435	485
48	2250	450	350	400
72	2320	380	280	330
96	2377	323	223	273
120	2425	275	175	225



buildup relationship can be found as:

$$P = P_s - (P_s - P_o)\, e^{-ct} \quad (4)$$

To illustrate this relationship, Fig. 1 was prepared which shows the pressure-buildup data from well "A," a low-productivity-index well in South Texas. It may be noted that the pressure increased from 2,165 to 2,250, or 85 psi. during the first day, from 2,250 to 2,320, or 70 psi. during the second day; from 2,320 to 2,377, or 57 psi. during the third day; from 2,377 to 2,425, or 48 psi. during the fourth day.

After a total of 120 hours or 5 days, the pressure was apparently still building up, and it is obvious that in this case many more days of shutdown would have been required to reach the desired bottom-hole pressure.

Muskat's Method

Dr. Muskat[1] proposed the so-called semilog extrapolation method to eliminate this additional waiting period. His method is based on the relationship of Equation 3 and is illustrated on Fig. 2 with the data from Fig. 1. It consists of the following steps:

1. Assume a value for P_s and determine $P_s - P$ for each of the pressure observations.
2. Plot the values for $(P_s - P)$ obtained against time t on semilog paper.
3. If the points fall on a straight line, the correct value for P_s was selected.
4. If the points do not fall on a straight line but seem to curve downward, the value chosen for P_s was too low and a higher value should be tried out.
5. If the points seem to curve upward, the selected P_s value was too high and a lower one should be chosen.

Two or three trials are usually necessary to find a reasonably accurate value for P_s.

In the example on Fig. 2 the pressure differentials were first plotted against time on semilog paper for an assumed value of the static bottom-hole pressure P_s of 2,700 psi. (top curve). The right-hand side of this curve appeared to be turning upwards. The next selection was P_s = 2,600 psi. (bottom curve), which made the curve turn the other way. As a third selection, P_s was made equal to 2,650 psi., which resulted in a reasonably straight line, indicating that the correct value was found.

The advantage of this method is that it works just as well for unequal time intervals as for equal time intervals. Its disadvantage is that it is only valid when there is straight Darcy-type flow into the well bore so that the productive index is constant. If the index changes suddenly or gradually, the method loses it value. It was therefore attempted to make use of the simple linear relationship in Equation 1 to find a method that would make a more straightforward extrapolation possible without the necessity of using semilog graph paper and without the previous trial-and-error procedure.

Differential Plotting

The principle of the new method was to plot dP/dt or the pressure increase per unit of time against pressure P so that extrapolation of the straight line trend obtained would automatically lead to $P = P_s$ for $dP/dt = 0$. For all practical purposes this means finding the intersection of the dP/dt against P line with the horizontal axis as shown in Fig. 3. The true buildup rate dP/dt would require accurate determination of pressure increases over very small time intervals. This is practically impossible since the measurements taken are subject to the normal limits of accuracy in pressure bomb readings.

It is fortunate, however, that if the time intervals are held constant, the method can still be used when the actual pressure increments are substituted for the true differentials. This means that one can plot the increase in pressure per day or per hour against the pressure at the end or the beginning of each interval and still expect to get a straight-line relationship, which, upon intersection with the horizontal pressure axis, will yield the desired static pressure. This can be proved as follows:

When three pressure observations, P_o, P_1, and P_2 are available at respective shut-in times of 0, t and 2t hours, the corresponding relationships, according to Equation 4 are:

$$P_s = P_1 + (P_s - P)\, e^{-ct} \quad (5)$$

$$P_s = P_2 + (P_s - P_o)\, e^{-2ct} \quad (6)$$

which, by elimination of e^{-ct} can be simplified to:

$$\frac{P_s - P_2}{P_s - P_o} = \frac{(P_s - P_1)^2}{(P_s - P_o)^2} \quad (7)$$

from which P_s can be solved directly (2) as:

$$P_s = \frac{P_1^2 - P_o P_2}{2P_1 - P_o - P_2} \quad (8)$$

Suppose now that the buildup rate $\frac{P_1 - P_o}{t}$ over the first interval is

(Continued on page 128)

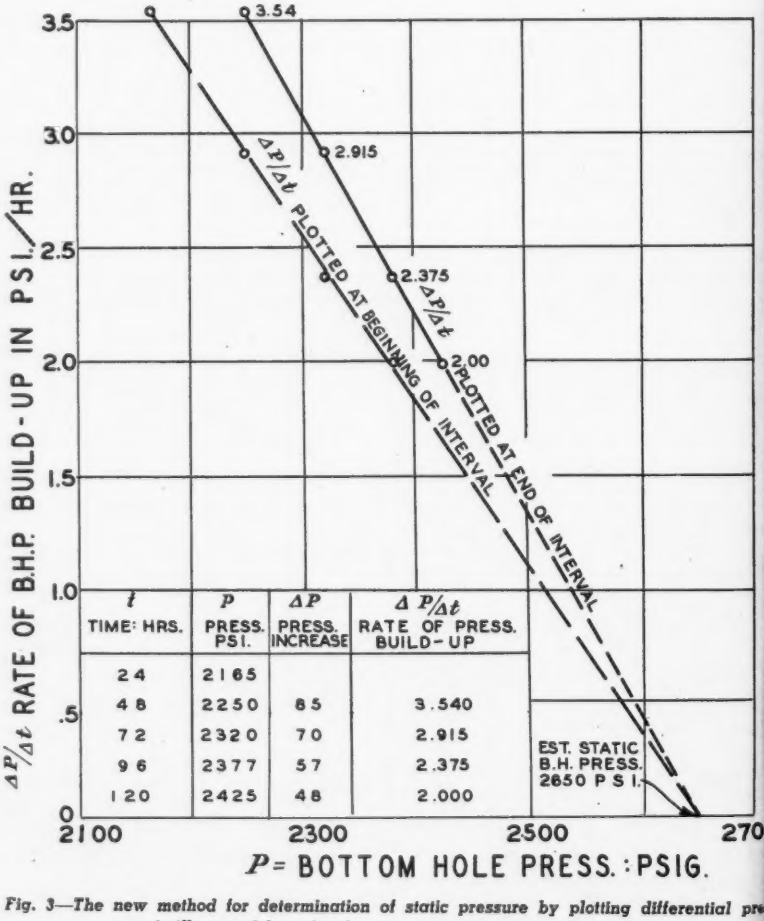


Fig. 3—The new method for determination of static pressure by plotting differential pressures is illustrated here for the same example used in Figs. 1 and 2

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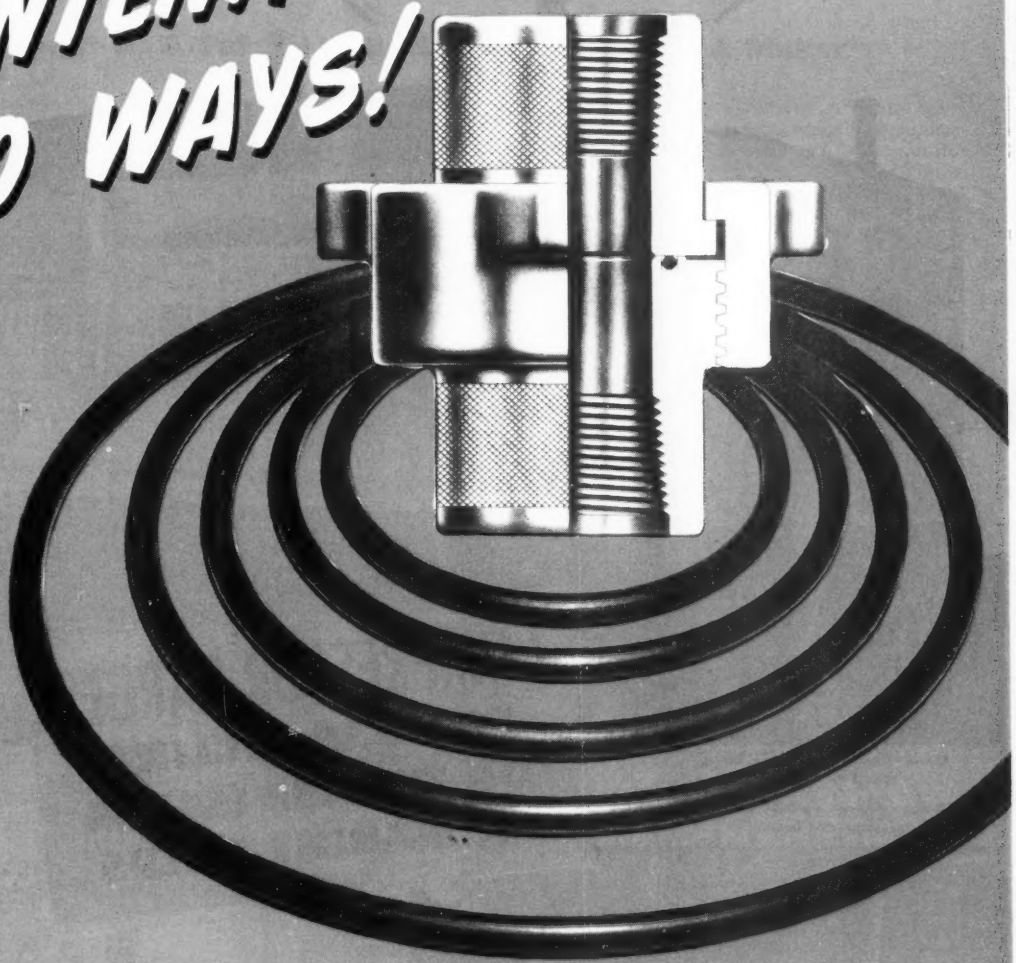

Field performance has proved that maintenance costs on Yale Wing Unions are extremely low. The Murray-molded self-sealing rubber "O" ring (interchangeable with a Murray-molded asbestos and rubber "O" ring for steam service) has contributed materially to this record. The rubber seal ring lasts indefinitely in oil, gas, acids and heat and may be easily and economically replaced in the field.

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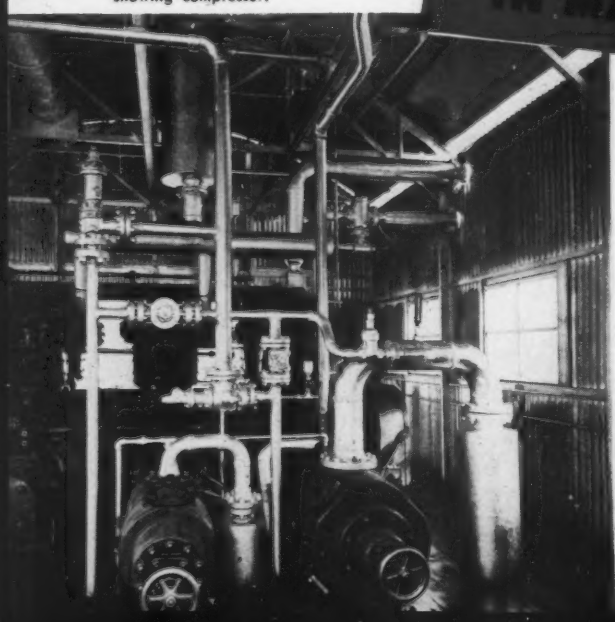
Below—Interior view of Barge showing compressor.



Here is another example of Levingston's leadership in the field of specialized marine equipment for the petroleum industry.

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Hypersorption

A process for separation of gases and vapor— Two commercial units now in continuous operation

by Clyde Berg,* R. G. Fairfield,* D. H. Imhoff,* and H. J. Multer*

THE Hypersorption process for separation of gases and vapors is rapidly gaining in importance as a unit process in chemical-engineering operations. There are now two commercial units in continuous operation. Other units of large capacity for both refinery and natural-gas field use are now in various stages of engineering and construction.

The process is capable of effecting separations and recoveries of light gases which were previously considered to be uneconomical. A moving bed of activated carbon is employed to absorb hydrocarbons out of lean gas streams. This material has a pronounced selectivity for the adsorption and retention of relatively large quantities of volatile hydrocarbons at low pressure.

The general construction of a typical Hypersorption unit resembles that of a fractionating tower with the addition of accessory equipment to effect transfer of solids from bottom to top, and to provide storage. The general construction of the unit is varied from case to case to suit the processing conditions involved. In the case where extremely lean gas is being processed, two or more feed trays may be employed as illustrated in Fig. 1. The use of multiple feed trays increases the capacity of the unit approximately directly as the number of such trays. It is particularly useful in applications such as processing of lean natural gas, propane recovery, and processing of coke-oven gas for ethylene recovery. The side-cut construction employs a separate internal stream of carbon to fractionate this side product to obtain a composition free of both lighter and heavier contaminants.

Engineering of the Hypersorption process has involved the development of a number of specialized mechanical designs. The basic concept of the unit is predicated upon positive control of the motion of solids in the unit. All the flow paths have been designed so as to be symmetrical across the area of the unit and to permit vertical downward motion of the solids with minimum opportunity for channeling or unequal flow distribution. The engaging and disengaging trays are constructed with a similar view and consist of circular plates having symmetrically spaced downspouts through which the solids pass and under which the gases are permitted to engage or disengage. The flow-control mechanism, of the positive-displacement type, assures equal flow of solids throughout the cross-sectional area of the unit.

*Union Oil Co. of California, Los Angeles. Summarization of paper presented at the annual meeting of the Natural Gasoline Association of America, Fort Worth, April 20-22.

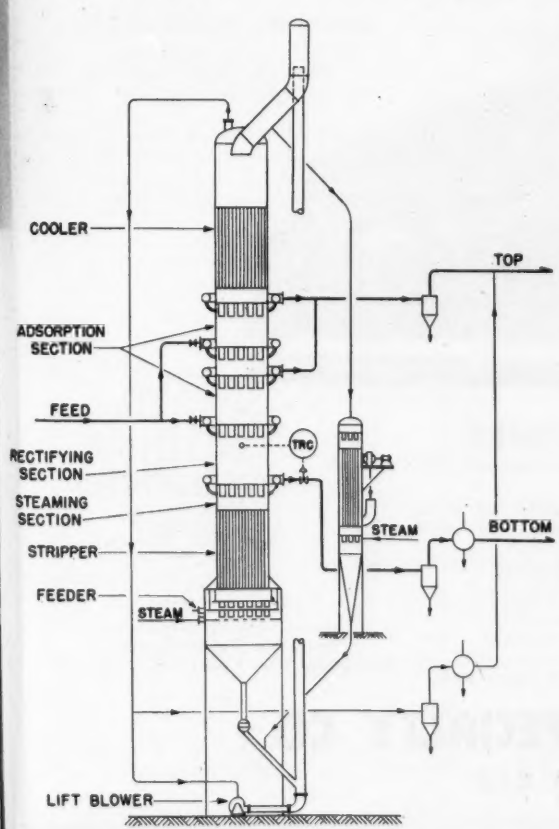

Fig. 1—(Left) Arrangement of unit with double-feed inlet

Engaging and Disengaging Trays

Fig. 2 illustrates the typical construction of the engaging and dis-

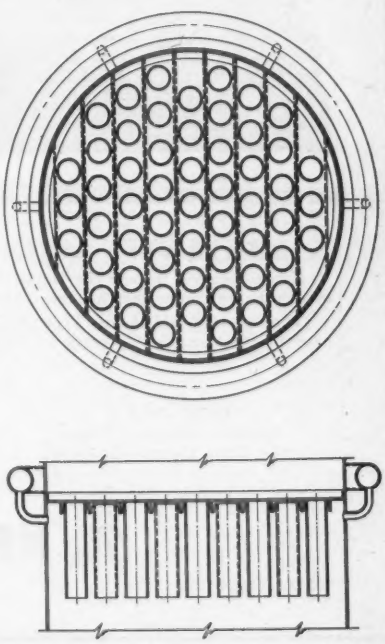

Fig. 2—(Right) Diagram of engaging and disengaging tray

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engaging trays employed in the unit. These trays have a number of geometrically arranged downspouts which serve to conduct the solids downward in a uniform manner throughout the cross-sectional area of the tray. Disengaging of the gases occurs underneath the trays and the respective amounts of area inside the tubes and outside the tubes are proportioned in accordance with the flow quantities of gas either disengaged or fed upward in the unit through the downspout section. A number of inlet or outlet points is employed to minimize pressure drop in the gas distribution across large-diameter trays.

Fig. 3 illustrates a flow-control mechanism. It consists of a circular tray supported at three points and given an oscillating motion. This tray has a number of downspouts which serve as pockets for the conveyance of solids. These downspouts are so aligned with corresponding tubes and slots in stationary trays above and below that half the downspouts are filling and half discharging at each end of the reciprocating stroke.

The separation of gases over activated carbon is a fractionation process involving the countercurrent contacting of the components in two phases and is quite analogous to the conventional multicomponent fractionation processes. The factors of reflux ratio, stage number, and variable molal flow of phases are of importance together with the controlling adsorption effects of activated carbon which dictate the relative volatility of the components and thereby the separations occurring in each stage of contact.

Commercial Hypersorption operations have shown virtually no deterioration in activity of the carbon employed. Pilot-plant operations previously established the ability of the reactivation operation to remove accumulations of absorber oil and polymers of heavy diolefins where necessary. The performance of the reactivator in commercial operations has confirmed pilot-plant studies.

Attrition Loss

Attrition losses in circulation of activated carbon in the Hypersorption unit are very low because of the free-flowing nature and homogeneous structure of activated carbon grains. The gas-lift system employed in the unit has no curves or bends which would cause direct impact of suspended solids against the pipe wall. In the separation of the suspended solids from the gas stream, a specially designed impactless separator is employed, which serves to remove solids from the gas stream without direct impact against the steel wall. The activated carbon employed in the unit has a mesh range of 12-30 Tyler screen series when charged. Screen analysis of a typical charge is presented in Table 1.

This material has a bulk density of about 29 lb. per cubic foot. As the carbon is circulated, the density increases to approximately 35 lb. per cubic foot. This is attributable to the redistribution of the mesh range and development of particles which are more nearly spherical. The screen analysis of a charge after equilibrium is attained is presented in Table 2.

TABLE 1—SCREEN ANALYSIS OF TYPICAL CHARGE OF ACTIVATED CARBON

Tyler screen size	Weight % retained
12	0.2
20	68.2
30	27.1
35	1.8
60	1.5
Through 60	1.2

TABLE 2—SCREEN ANALYSIS OF ACTIVATED CARBON AT EQUILIBRIUM

Tyler screen size	Weight % retained
12	0.7
20	52.2
30	27.3
35	8.2
60	9.6
Through 60	2.0

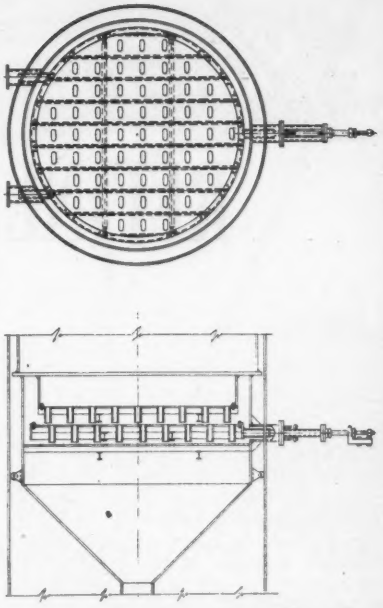


Fig. 3—Plan and elevation views of flow-control mechanism of Hypersorber

Commercial Performance

The first Hypersorption unit constructed was located at Midland, Mich., and was built to recover ethylene normally lost in the demethanizer column overhead stream in a low-temperature fractionating unit. This

(Continued on page 130)

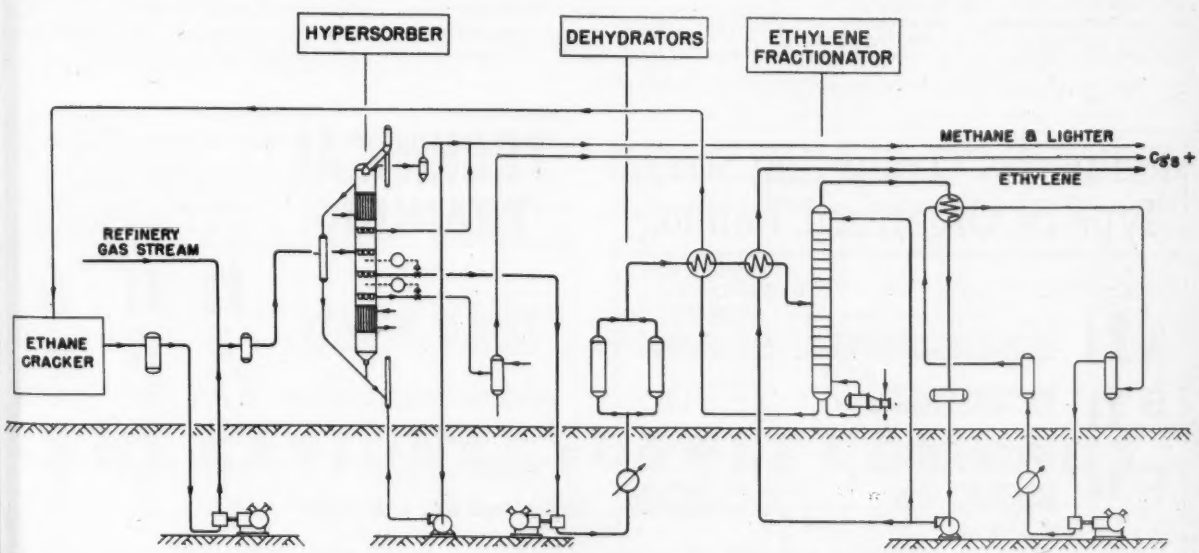


Fig. 4—Flow scheme of Hypersorption plant for recovery of ethylene from refinery gas streams with ethane cracking

Survey on

REFINERY TRAINING PRACTICES

—Highlights of some of challenges indicated

by Harry D. Kolb*

DURING 1948 a survey was conducted by University of Texas, under the auspices of the Committee on Training in Refining of the American Petroleum Institute. This was a detailed analysis of the training activities at 144 out of the 188 United States petroleum refineries having a nominal daily throughput of 5,000 bbl. a day or more. This was not a questionnaire by mail. Meetings were held all over the country

A very high coverage of 81 per cent of the plants resulted. In Fig. 1 is shown the per cent coverage by size of plant. Only in the case of the class "C" plants (unaffiliated) was the coverage somewhat limited. But even there data were secured on 38 plants.

These smaller plants are considerably less active in the training field in general than might be expected. Fig. 2 shows that, in the class "C" plants (5,000 to 20,000 bbl. per day), less than half of the unaffiliated group have any single organized training program (also found in one out of four of the affiliated plants of this size). Admittedly, the absence of an organized program does not mean a vacuum exists. Training is going on all the time in one form or degree. However, due to the inherent limitations of the completely unorganized type of training which relies on incidental job experience alone, plants which have only that type of training received no credit for it in this survey. The data throughout are, however, a factual reporting by each plant of its own situation.

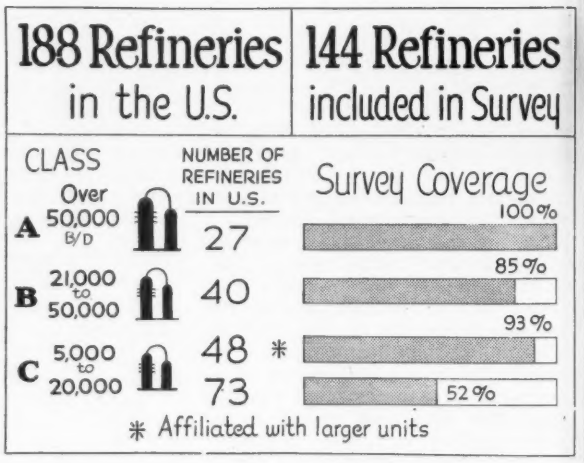


Fig. 1

The total personnel covered by the survey was 131,500. Looked at in terms of numbers, it would appear that the industry has programs of some type or other in plants where approximately 90 per cent of the personnel are employed. Whether this is a real accomplishment depends, of course, on how many of these employes benefit directly. In a number of plants, for example, the only organized program proved to be safety courses or supervisor training.

Technical Training

Looking first at the training provided the technical personnel: This group is limited to the engineers,

(Continued on page 103)

Refineries Conducting Some Type of Organized Training

CLASS		NUMBER OF EMPLOYEES AT PLANTS
A	100%	85,800
B	80%	28,700
C *	71%	11,000
	40%	6,000

* Affiliated with larger units

Fig. 2

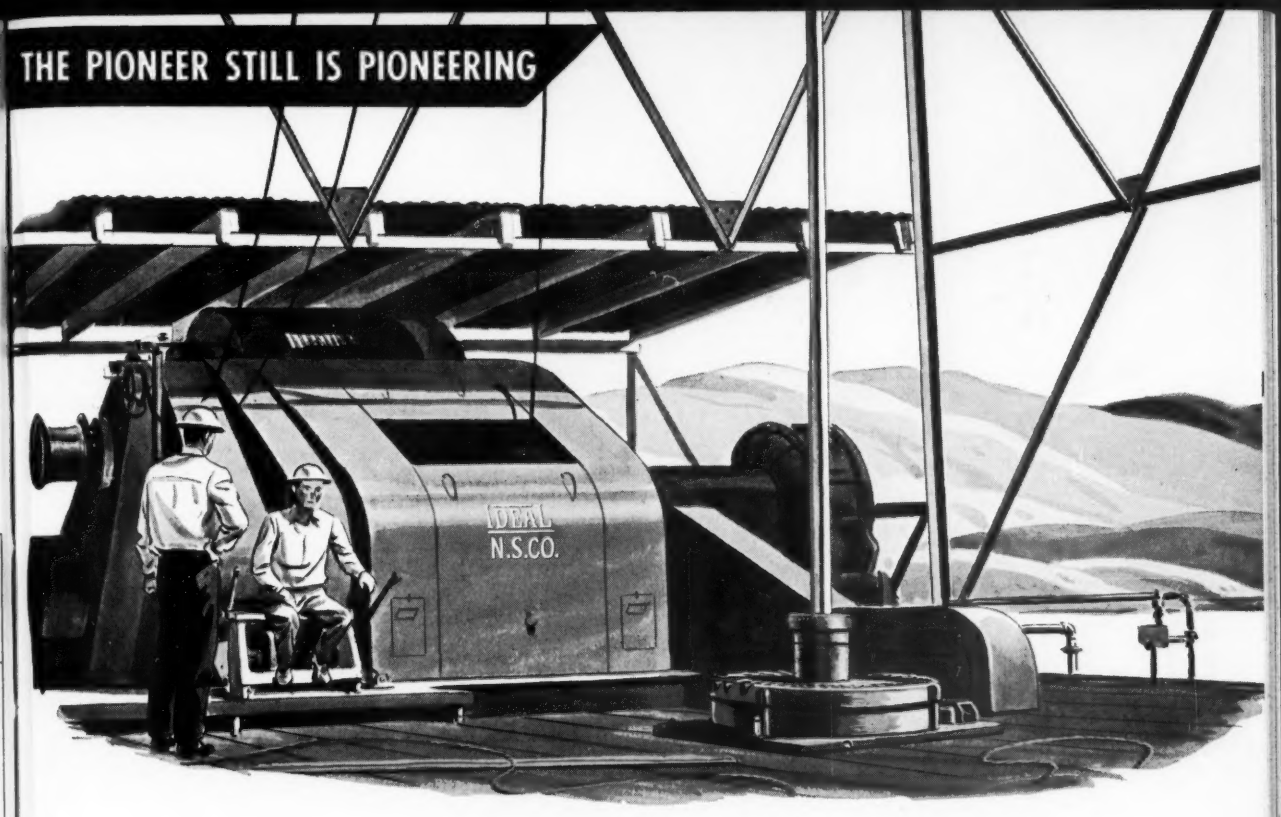
TECHNICAL TRAINING IN 102 "Affiliated" REFINERIES

TYPE of ACTIVITY	CLASS A	CLASS B	CLASS C
Advanced Study Seminars	37%	5%	0%
Staff Lecturers	50	30	10
Outside Lecturers	30	20	10
Planned Job Rotation (For New Men)	63	25	—

Fig. 3

*Esso Standard Oil Co., New York, chairman, A.P.I. Committee on Training in Refining. Summarization of paper given at midyear meeting of A.P.I., Refining Division, Houston, April 4-7.

THE PIONEER STILL IS PIONEERING



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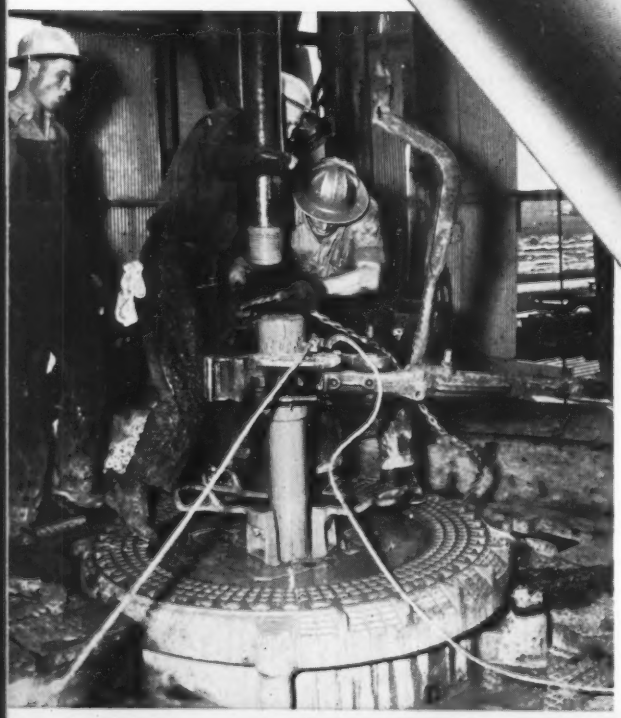

Note how every pipe thread is engaged, and its root is supported by a tool joint crest. The notch effect at the bottom of the conventional V-type thread is eliminated.

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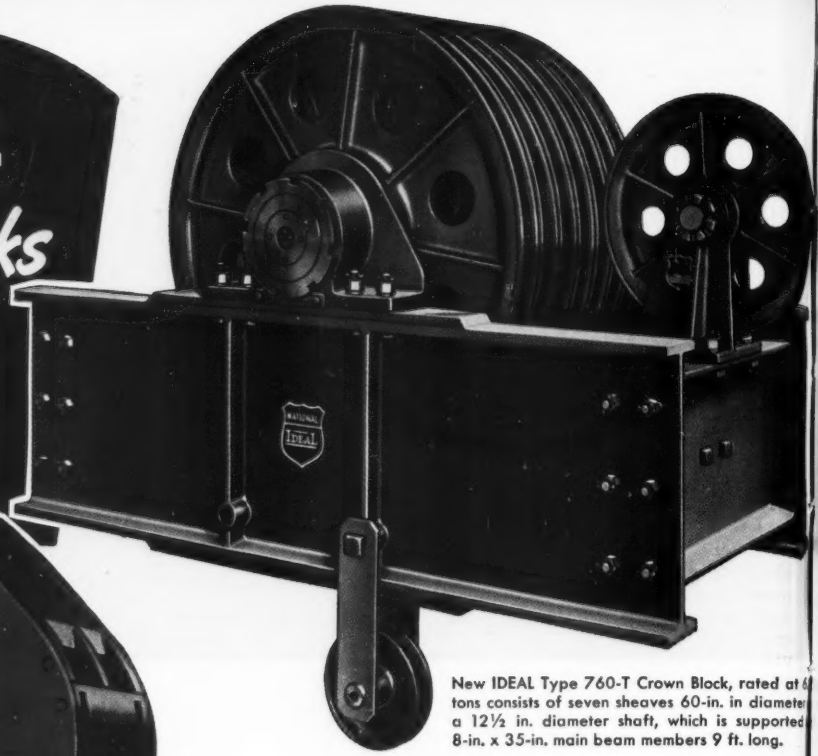

New IDEAL Type 760-T Crown Block, rated at 6[illegible] tons consists of seven sheaves 60-in. in diameter on a 12½ in. diameter shaft, which is supported by 8-in. x 35-in. main beam members 9 ft. long.

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SUPERVISOR TRAINING	IN 57 REFINERIES (21,000 B/D & up)	
PHASE of TRAINING	NOW TRAINING	HAVE TRAINED 100% OF SUPERVISORS IN LAST 6 YEARS
Union Contracts	60%	70%
Human Relations	45	60
Company History & Org'n	40	45
Management Principles	30	33
Job Instruction	25	55
Job Methods	20	25

Fig. 4

SUPERVISOR TRAINING	IN 83 REFINERIES (5,000 to 20,000 B/D)	
PHASE of TRAINING	NOW TRAINING	HAVE TRAINED 100% OF SUPERVISORS IN LAST 6 YEARS
Union Contracts	22%	24%
Human Relations	20	20
Company History & Org'n	5	9
Management Principles	11	13
Job Instruction	10	18
Job Methods	9	12

Fig. 5

chemists, and other technically trained personnel. A need for training in this field would be predicated on the concept that the industry needs to provide a transition between academic education and the practices of a particular plant. The extent to which a plant can, and should, supply this training is, of course, debatable. Other training services do exist in the form of technical associations, publications, and extension or supplementary courses from schools.

Fig. 3 gives some highlights on the facts on technical training as provided for the personnel in our refineries. In the plants which have a capacity of more than 50,000 bbl. per day, four types of activity receive considerable attention. In 63 per cent of these plants a program is used to insure a rounded breaking in of the new man. In 37 per cent provision is made for advanced study—often as a cooperative venture with college or university aid. Lectures by staff, or outside personnel, are common for the purpose of aiding the technical group.

The smaller plants give relatively little attention to this area of training. Much more difficulty confronts those plants in this field, of course. In the 42 smaller refineries not affiliated with larger plants, no significant technical training exists at all (these are not included in the 102 plants covered in Fig. 3). The 45 class "C" plants shown are similarly doing relatively little.

Activity in this field is not necessarily limited by the size of the plant. Much can be done by the smaller plant to make more liberal use of the training opportunities available through technical associations, and to encourage the public educational agencies to sponsor and provide courses and seminars.

Supervisor Training

The training of supervisors in industry is widely acknowledged as the first line of attack on virtually all problems of efficiency, morale, harmony, and even problems of training. Most significant were the efforts of industry as a whole during the past war. Some courses sponsored by the Government reached well over 1 million supervisors. Training services were not restricted to what the plant could afford. The public educational agencies played a large part in bringing programs and trainers to all types and sizes of plants.

Less affected by expansion and conversion than many war industries, petroleum refineries seem to have made use of only a part or parts of the war-born supervisor-training programs. A view of the activity of the 57 refineries with a capacity in excess of 21,000 bbl. per day is shown in Fig. 4. With the exception of specific instruction on union contracts in 60 per cent of the plants, other typical areas of supervisor training are being handled in only 2 to 4 of every 10 plants.

In Fig. 5 similar information is given for the 83 refineries smaller in size. Much less activity is noted. In about 8 plants out of every 10, no supervisor training is provided. Nor has much been done in the past six years. It appears that little use was made of wartime training services—even when they were available without cost.

This raises the question of need. The normal reasons given by a manager for sponsoring supervisor training hinge on such factors as benefits from the sharing of viewpoints in

CRAFT TRAINING	IN 57 REFINERIES (21,000 B/D & up)	
TYPE of ACTIVITY	NOW TRAINING	HAVE TRAINED 25% OF WORKERS IN LAST 6 YEARS
Job Training for new skills	30%	23%
Blueprint Reading	27	10
Basic Sciences	25	0
Shop Mathematics	20	16
Company History and Organization	17	7

Fig. 6

APPRENTICE TRAINING	IN 57 REFINERIES (21,000 B/D & up)
CRAFT –	Plants Conducting Training
Machinist	27 %
Instrument	23
Electrician	23
Pipefitter	21
Boilermaker	18
Carpenter	16
Painter	16
Welder	14
Sheet Metal	14
7 Other Trades	2 to 10

Fig. 7

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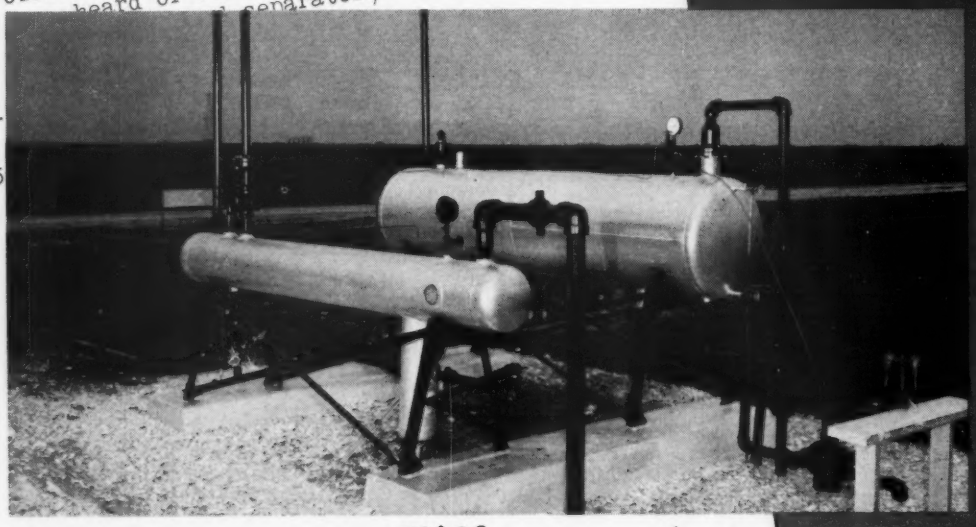

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PROCESS TRAINING	IN 57 REFINERIES (21,000 B/D & up)	
TYPE of ACTIVITY	NOW TRAINING	HAVE TRAINED 50% OF WORKERS IN LAST 6 YEARS
How own unit operates	33%	12%
How other units operate	23	18
Planned Job Training	20	12
Company History & Org'n	18	7
Observing other units	16	0
Basic Science	12	9

Fig. 8

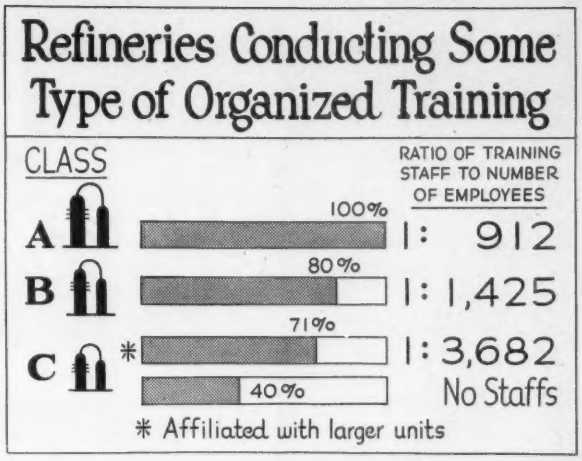

Fig. 9

conference-style sessions on problems related to handling of personnel, policies, and techniques for more efficient direction of manpower. Coupled with this is the problem of training the new foreman to assist in his transition to the ranks of management. The survey indicates that a real challenge still exists here for many plants.

Only about half of the largest plants indicated they had programs which meet the criterion of being well rounded on the various phases of supervision. Those plants which provide special training for the new foreman are so few they can be counted on two hands.

Activity is not always related to size. Little difference is shown between the 20,000 to 50,000-bbl.-per-day plants and those much larger. On the other hand, in 37 out of 38 unaffiliated plants of 5,000 to 20,000-bbl.-per-day capacity virtually nothing was being or had been done on supervisor training.

Craft Training

Grouped under the heading of craft training are those activities aimed at training the mechanical personnel at a refinery. Fig. 6 gives highlights of the survey data on 57 plants which have a normal daily throughput in excess of 20,000 bbl. per day.

Most commonly reported were on-the-job type of programs for upgrading men within their trade. How well organized these programs might be was not measured, but they did not meet the test of being considered apprenticeship training. Almost one-third of the plants reported activity of this type. Fewer than that have given such training to as many as one man in four during the past 6 years.

Not shown in Fig. 6 are the plants with a daily throughput of 20,000 bbl. or less. In only 5 to 10 out of the 45 plants affiliated with larger units are there programs to the extent shown in Fig. 6. There are virtually no job-training programs sufficiently organized to be reported by the 38 class "C" unaffiliated plants.

It is difficult to estimate how much activity should be expected here. This area of training is strongly influenced by the hiring practices of the industry. Whenever skilled craftsmen are hired as such, the burden of their training has already fallen either on the vocational schools or on the previous employers. Slow movement of helpers into the ranks of craftsmen similarly permits longer time for gradual absorption of skills by the informal, and often unorganized, job-experience route. Yet, with much of the industry emphasizing both stability of employment and promotion from within, the challenge here is apparent. Investment in organized job training can raise a higher percentage of the work force to the full skill requirements of their present position, and can furnish a planned flow of qualified men into higher jobs, as required.

A number of the most highly organized programs in this field frequently meet the criteria associated with apprenticeship. Although not many may be labeled as such (frequently because of a preference for such terms as "trainee" over "apprentice"), some indication of this activity is shown in Fig. 7. None of the smaller plants reported apprentice programs. Most plants among the 57 covered in Fig. 7 conducted programs in only several of the trades shown. Activity of this type seemed to vary with spot shortages of specific craftsmen from time to time. Many of these programs do not graduate the man to a journeyman rating automatically, but merely qualify him for vacancies in the future.

Process Training

In the areas of training previously discussed herein there are precedents and comparisons with other industries. Also the training techniques involved are well established. The literature provides most of the answers as to how to organize and conduct supervisor training and trade training. The cooperating-public educational agencies have the necessary experience to enable them to give aid and counsel. This parallel does not exist to any marked degree in the field of process training.

This area covers the training of the operators, as distinct from the technical training given the engineers and chemists. Fig. 8 indicates the extent of organized process training currently offered, as well as the percentages, by the 57 plants which have extended this type of training to at least half of their operators in the past 6 years. The first two types of training refer to classroom-type sessions on theory and operating directions. The third type, "planned job training," is carried out for the main part on the unit—thus individualizing the training to each specific job.

There are 87 other refineries covered in the survey (all but 4 have a capacity of less than 20,000 bbl. per day). Only two to five of these are doing organized process training. Only two to five have trained as many as 50 per cent of their operators in the past 6 years.

These figures are surprising when consideration is taken of the numerous new refining units placed in operation since the start of 1942. The extensive training of operators necessary for the starting of a new unit must loom large in the total amount of activity reported. In turn, this would indicate that relatively few plants have provided operator training to personnel on older units—or to replacement personnel.

Of course, the survey does not measure "incidental" training if the reporting plant regards this as "unorganized." It appears, then, that many plants are relying on incidental job experience. In view, however, of the reported benefits of planned training in this field, some questions remain. Larger throughputs and higher quality control have been shown by some to be possible as a result of programs

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which have for their purpose the training of operators to understand their units, associated units, and operating standards.

Several problems are most frequently reported, as follows: the difficulty of scheduling shift personnel for training in classroom situations; the question as to whether classroom training is the correct approach; the difficulty of determining the requirements which make up the training curriculum; and the limitations apparently inherent in training on the job. Undoubtedly the lack of research data from which could be determined the most effective training techniques in this field has contributed to a feeling of uncertainty on the part of many of the training staffs as to which steps ought to be taken when they institute programs for process operators.

Training Staffs

To some extent the degree of training activity in refineries is proportionate to the number of training staff specialists provided. Fig. 9 shows the same data on which Fig. 2 is based, but it indicates the number of training men assigned in each class of plant. The previous data show that greater activity results when there is 1 staff man per 912 employes in the larger plants. Examination of individual plants will show variations due, in some measure, to the fact that some staffs are serving as instructors whereas others put their major effort on development work and counsel.

The smaller plants generally have no full-time training men; yet a number have sufficiently identified training as a line responsibility of management so that part-time services are provided by line groups to handle the more acute needs. The large number of plants which have but a few hundred employes are the ones where a real challenge exists for the provision of satisfactory training needs without adding an unreasonable staff cost. Quite a few superintendents of such plants participated in the survey, and they showed real interest in finding methods and approaches to accomplish training under the conditions of their plants.

General Observations

1. The survey data may surprise many who point to the excellent record of the refining industry and its manpower accomplishments. The purpose of the survey was merely to reveal which areas might need industry-wide attention, and to aid local managements to make a more critical analysis of their own activities. Much depends on which viewpoint one takes on the statistics.

2. In the absence of comparable data on the training activity in other industries, no conclusions are possible

(Continued on page 136)

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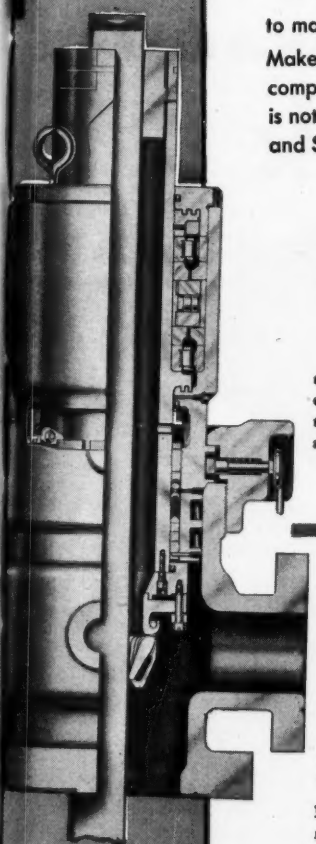

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Because the Shaffer Combination Rotating Blow-Out Preventer and Stripper maintains its leak-proof seal *continuously* while pipe is in the hole, there is nothing to *operate,* nothing to *remember,* nothing to *forget* when sudden pressure emergencies occur. The unit is *always* packed-off around the drill string . . . *always* ready for instant protection against pressure blow-outs!

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In addition to maintaining a continuous pressure-tight seal, the stripper rubber in the Shaffer Combination Rotating Blow-Out Preventer and Stripper also expands and contracts *automatically* to fit the various shapes and diameters in the drill string. It seals around square, hexagon and octagon kellys as well as around drill pipe. And, excepting such abnormally large diameters as bits and reamers, the varying diameters of the tool joints, upsets, couplings, substitutes, etc., readily strip through the unit without losing the pressure-tight seal!

Maintenance is negligible!

Because the Stripper Unit and kelly rotate together—not one inside the other—wear on the Stripper Rubber is reduced to a minimum. Moreover, there is no flexing of the Stripper Rubber or loss of sealing contact around the kelly or drill pipe as the drill string rotates, thus assuring a continuous and tight seal.

In addition, the bearing assembly upon which the unit rotates is specially engineered to withstand the severe loads of modern high speed drilling, with separate thrust and radial bearings to carry each type of load. Bearings are lifetime pre-packed with heat-resisting lubricant, further minimizing maintenance!

No Special equipment required!

In addition to its many other advantages, the Shaffer Combination Rotating Blow-Out Preventer and Stripper requires no special kellys or drill strings for its operation. The unit seals off around *any* type of pipe—coupled, upset or flush—with equal efficiency and safety whether the drill string is being raised or lowered, rotated or not. Also, a square, hexagon or octagon kelly may be used—whichever is preferred—and the unit seals automatically and continuously around each type.

What's more, such abnormally large diameters as bits and reamers can be readily passed through the unit by simply pulling a latch and rotating the Bonnet 1/6th turn, whereupon the entire internal mechanism is withdrawn with the bit or reamer. Simply reverse the operation when going back into the hole. It's easy, *quick!*

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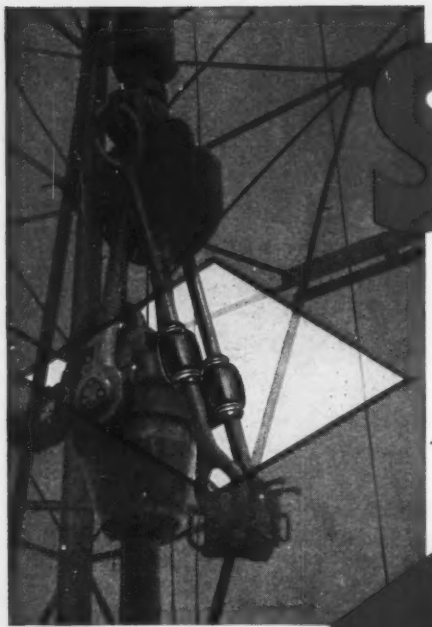

Save LINKS SWIVELS AND SWIVEL BAILS from wear

WITH THE NEW PATTERSON-BALLAGH Link Bumper

Here's an economical way to reduce wear on expensive equipment. Protect your links, swivel bail, and swivel from constant pounding with this new, low-priced LINK BUMPER. Made from tough wear-resistant rubber, this bumper holds the link away from both swivel bail and swivel to prevent wear at those two vulnerable points. Clamps may be loosened and bumper rotated to get double wear from each Link Bumper.

These Patterson-Ballagh Link Bumpers are easy to install. Each bumper is cut on one side as shown in the enlarged view. The bumper is quickly snapped over the link at swivel body height and made secure with clamps at each end. Streamlined shape with recessed clamp prevents catline and equipment from being fouled.

POPULAR SIZES AVAILABLE

Size Link	Dia. Link Shank	Overall Bumper Length	Bumper Dia.	Code Name
1¾"	2⅜"	12"	7⅜"	BAILEE
2¼"	2⅞"	11¾"	7⅜"	BAILOR
2¾"	3½"	11⅜"	7⅜"	BAILMENT

Link Bumpers more than pay for themselves by saving expensive equipment from needless wear. Ask your Patterson-Ballagh man about these new bumpers and then install a set on your links.

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Superior DRILLS TO 18,734 FT. *at* VENTURA, CALIFORNIA

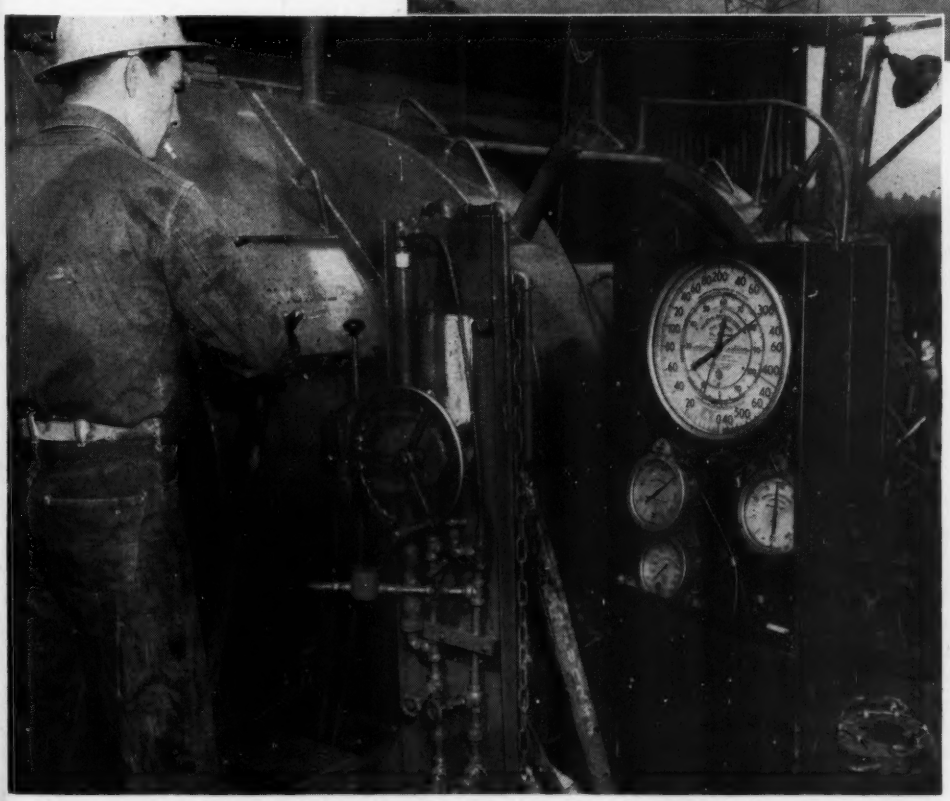
MANY deep-drilling records have been made since Chanslor-Canfield Midway Oil Co. drilled the first 10,000-ft. well with an old Hild electric drive in Rincon field of California, in 1931, but none has been more impressive than the last three world's records, all of which have been made in the last 2 years by Superior Oil Co. of California. These records in order are:

The 51-11 Weller, 11-8n-12w, Caddo County, Oklahoma; completed in 1947 as a dry hole at 17,823 ft. in Pennsylvanian formation.

The 1 Limoneira, 9-2n-22w, Ventura County, California; completed as a dry hole on March 13, 1949, at 18,734 ft. in Pliocene formation.

The 1 Pacific Creek Unit, 27-27n-103w, Sublette County, Wyoming; drilling below 19,000 ft. at the time of writing.

So, while even in the late 20's, many petroleum engineers and others were skeptical about the practicability of drilling to 10,000 ft., is now seems reasonable to assume that within 20 years from the time the first 10,000-footer was drilled, operating skill and mod-



Above: View, across mud pit, of the heavy-duty steam rig that drilled 1 Limoneira (9-2n-22w, Ventura County, California) to 18,734 ft. total depth. Derrick is 176 ft. high, with 32-ft. base, has an 11-ft. substructure (capacity 980,000 lb.)

Driller K. Compton of Superior Oil at the brake. Weight of the drill pipe and traveling assembly as suspended in mud at 18,000 ft. was 340,000 lb.

THE WORLD'S DEEPEST WELLS

THE SUPERIOR OIL CO.'S LIMONEIRA 1, WILDCAT, 18,734 FEET ON MARCH 14

MEDEARIS BULLDOG DRILL PIPE AND CASING PROTECTORS WERE USED 100% IN DRILLING THIS WELL

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CALL

MEDEARIS

Oil Well

SUPPLY CORP.

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Bakersfield • Ventura • Avenal • Santa Ma

Above: View of rotary table and draw works used on the deep test. Right: This photo shows the standby draw works. A 12 by 12-in. steam engine is used for the rotary drive

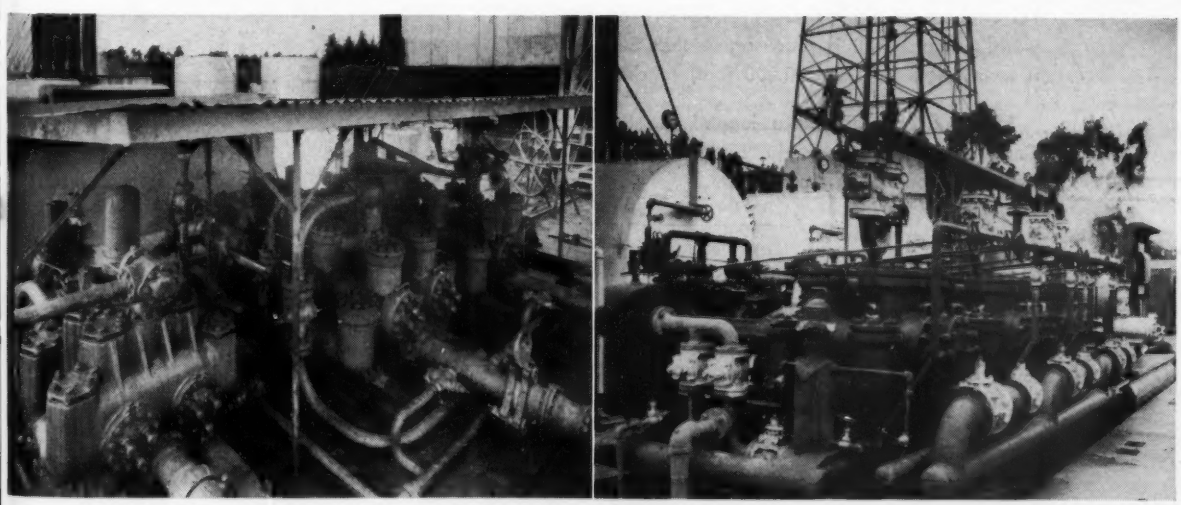
ern equipment will take a well to double that depth.

Superior's last two deep wells noted above—in Ventura County, California, and Sublette County, Wyoming—broke the world's depth record within 60 days of each other, in February and April of this year. The company has released considerable data on the California record breaker, which reveal an outstanding drilling accomplishment, but details concerning the Wyoming project will probably be held up pending completion.

It is noteworthy that both wells have been drilled without any major mechanical delays. This is considered to be a tribute to the use of modern equipment, carefully maintained; the careful selection and training of drilling crews, and close supervision by an exceptionally able executive staff.

While many of Superior's development wells are drilled by contractors, the company is a great believer in running its own tools on its wildcat wells. It uses the most modern equipment and its rigs are always maintained in peak condition.

A major factor in the success of this company in drilling deep wells, aside from fine equipment, is the know-how of its top management. Oil men generally know W. M. Keck, Superior's long-time president, as a practical operator who rose to the top with a first-hand knowledge of how to drill oil wells. As a young man he worked as a tool pusher in Coalinga, California, field in the early days of its development and he has since been a well-known figure in California, as well as in other important oil districts in the United States. W. M. Keck, Jr., vice president, is an able executive with field experience, notably at Kettleman Hills, a first-class training ground. John C. Cody, vice president in charge of production, who also got his early training in Coalinga field, watches the company's many important drilling jobs closely and its fine record in avoiding mechanical difficulties is attributable in great part to his knowledge and ex-



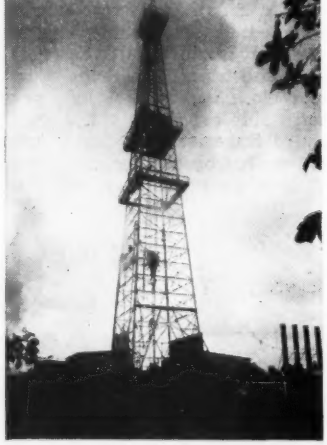
Left: Photo of mud and slush pumps, and discharge manifolds. Right: These are the feed-water pumps at the boiler plant

*At 18,734 feet,**

on The Superior Oil Company world's record depth well, Schlumberger made an electrical log in 3½ hours hole time.

Schlumberger made two runs below 18,000′ on The Superior Oil Company's Limoneira No. 1, the new world's record depth well. The first run was made at 18,110 feet and the second on March 13, 1949, at 18,734 feet. Both operations were carried out successfully as routine runs with regular Schlumberger surveying equipment and with a minimum of rig time. Only 3½ hours surveying time was required for each run. Performance of Schlumberger equipment on this new world's record well is proof again that Schlumberger is ready now for your 20,000 foot, or deeper, wells.

*Schlumberger has since logged the Superior Oil Company's Pacific Creek No. 1—the new record depth well in Wyoming—to 18,704 feet.



SCHLUMBERGER
WELL SURVEYING CORP.
HOUSTON, TEXAS

This Superior Oil crew is: E. A. O'Dowd, fireman; W. Horton, floorman; M. Harp, floorman; D. Campbell, floorman; C. Nelson, driller; Guy Stacy, derrick man

perience, and his ability to impart what he knows to his subordinates.

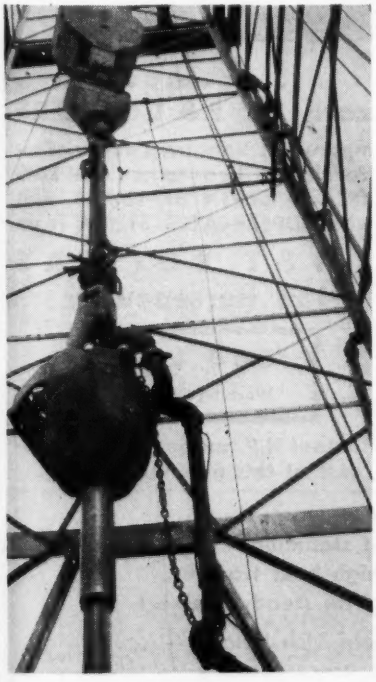
Personnel and Data—No. 1 Limoneira Well

The tool pusher, or drilling foreman, is an important cog in the Superior drilling machinery. On a wildcat well, a Superior tool pusher seldom leaves the rig. Melvin G. Uffen worked in this capacity on the Ventura County record breaker. Other staff members who were concerned with the drilling of that well included L. R. Rogers, chief petroleum engineer; Jack Isberg, chief geologist; Carl L. Corley, district drilling superintendent; and G. Y. Wheatley, resident petroleum geologist.

Data on the drilling of the 1 Limoneira wildcat in Ventura County, California, are given in the following paragraphs.

The well was spudded on September 6, 1948. Drilling stopped and the company prepared to abandon the well on March 13, 1949, at a total depth of 18,734 ft., or 911 ft. deeper than its former record holder, 51-11 Weller in Caddo County, Oklahoma. Only 189 days were required to reach this depth and the cost in round figures was $500,000. Actual time consumed in drilling was 2,085 hours, so average footage drilled per hour was 8.98.

The derrick was 176 ft. tall with a 32-ft. base, 11-ft. substructure, and a



Swivel, connector, blocks, and hose

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MORE ECONOMY

Expenses are reduced *in many ways* when Foster Catheads are on the job. The bit is on bottom *making hole* a higher percentage of time because *trips are made in less time;* labor costs are reduced; less money is spent on spinning rope; repair costs are at an absolute minimum. These savings are effected through outstanding design and construction principles developed during twenty-two years experience manufacturing catheads.

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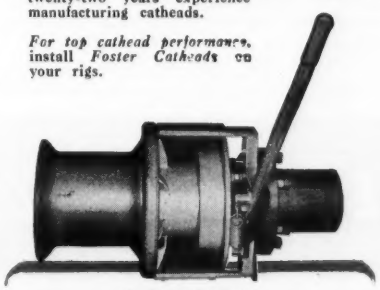

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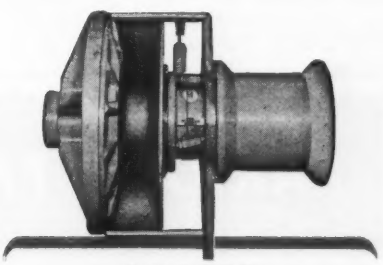
Safer **. . . hand-wrapping of spinning line is eliminated; thus also eliminating the possibility of the operator becoming entangled in the spinning line and badly injured. Drum instantly freed from contact with all moving parts when control lever is released. Therefore it stops instantly and will not crawl. New guard prevents line from getting off drum.** ***Faster*** **. . . driller operates cathead from regular position without leaving throttle; will spin and tong with forked line if desired.** ***Dependable*** **. . . heavy bearings, ample lubrication, powerful friction clutch, strong construction assure long service.** ***Economical*** **. . . minimum expense for rope and maintenance; no slow-down due to bad weather or short crew.**



FOSTER BREAKOUT CATHEAD

Safer **. . . slower line speeds prevent jerking of tongs.** ***Faster*** **. . . powerful friction clutch engages or disengages either instantly or gradually at the will of the operator without slowing cathead shaft.** ***Dependable*** **. . . heavy bearings, ample lubrication, powerful single plate friction clutch, heat-resistant clutch facings, high quality materials combine to make a durable cathead.** ***Economical*** **. . . designed for direct shaft mounting to reduce bending of cathead shaft; stationary sleeve mounting for drum (patented) common to both catheads, eliminates complicated brake.**

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Factory representatives:

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More Superior Oil employes that drilled to 18,734 ft.: J. Evans, floorman; Andy Bateman, floorman; W. N. Blake, fireman; C. Copeland, driller; Leon Bowen, derrick man; C. Craw, floorman

capacity of 980,000 lb. The National rig, a special heavy-duty job, was made to order for deep drilling in 1940 and until it drilled the Ventura County well had been used in drilling deep development wells in Greeley and Rio Bravo fields in the San Joaquin Valley, California. The 15 by 16-in. 500-psi. drilling engine operates on 500 lb. of steam. The boiler plant consisted of five 130-hp., 500-lb., all-welded boilers with stack blowers. Pressure at the boilers on the Ventura County well was 460 lb. when it reached 18,000 ft.

Actual drilling operations started with 12¼-in. hole which was drilled to 1,975 ft., then reamed to 17½ in., and 13⅜-in. 54.5 and 61-lb., range 3 seamless casing cemented at that point, which was the base of the fresh-water sand. Size of the hole below the surface pipe was 12¼ in. to 12,030 ft. At this point, a protective string of 9⅝-in., 53.50 and 47.60 lb., N-80 extreme line casing was run and cemented at 11,204 ft. when the pipe froze at this point. From 12,030 ft. to bottom 8⅜-in. hole was drilled. Four and one-half-inch drill pipe was used to 17,400 ft. at which point the string was tapered to 3½ in.

Generally speaking the hole was free and in excellent condition for drilling operations. Due precaution was taken to prevent sticking the drill pipe because of the nature of the formation in this area, and the practice in the later phases of drilling was to pick up off bottom about 60 ft. and circulate every 15 minutes. Weight of the drilling mud ranged from 80 to 85 lb., with the viscosity maintained at about 33 cp.

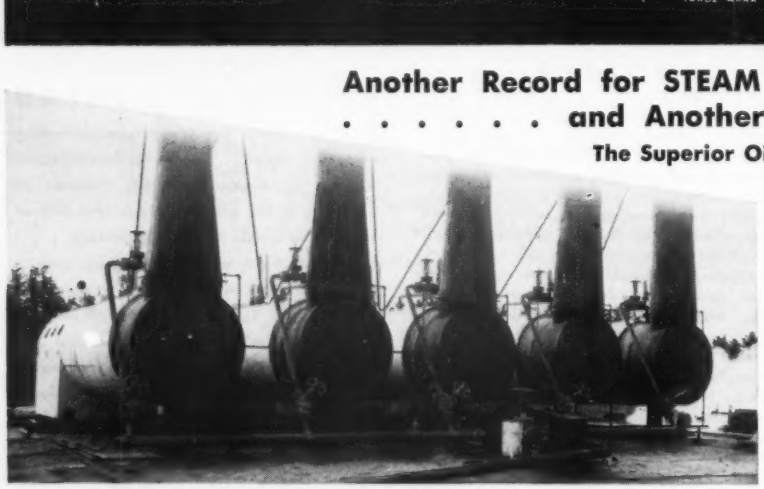
The bit record shows that 87 bits and 5 core heads were used in drilling 12,030 ft. of 12¼-in. hole. From that point to bottom at 18,734 ft., 77 bits and 15 core heads were used.

The final core was taken at 18,711-21 ft. and it was, of course, the deepest core ever taken in an oil well. In this 10-ft. interval, the recovery was 7 ft. of hard shale and siltstone. Previously 19 cores had been taken, with cored interval totaling 292 ft. Of this total, 156.5 ft. was recovered for a percentage recovery of 53.4. Superior's records show total coring time down to 18,438 ft. was 85.5 hours so cores were taken at the rate of 3.43 ft. per hour. The company hoped to enter the Miocene before hanging up its tools, but indicated the well was still in Pliocene formation at the end. In any event, the well penetrated the greatest thickness of Pliocene formation of any well ever drilled.

Fishing jobs were of a minor char-

FARRAR & TREFTS Streamline Welded BOILERS

Another Record for STEAM . . . . . and Another Record for F & T BOILERS



The Superior Oil Company (in Ventura County, California) drilled to a WORLD'S RECORD DEPTH of 18,734 feet with SUPERHEATED STEAM from

5 F&T BOILERS
150 Horsepower*

500 LBS.
Working Pressure

*Actual H.P. output is far in excess of this minimum rating.

SPECIAL F&T FEATURES

1. ALL-WELDED—for long life and low maintenance expense.
2. FIREBOX SIDES SLANTED—for quick and efficient steaming.
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4. LARGE WATER VOLUME—for smooth operation with steady pressure.

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Here's Junk Recovery . . .
The CAVINS MULTI-SURGE JUNK SNATCHER Way
60 Lbs. Of Cast Iron And Rubber Plus
Slip Segments And Cement Fragments
Out of Superior's World-Record Wildcat

For positive clean-out of junk at 11,162 feet, Superior's #1 Limoneira employed the Cavins Multi-Surge Junk Snatcher. This new hydrostatic-action, multiple-surge tool was developed expressly for cleaning holes of small junk, or fish—rock bit cutters, blades millings, broken slips, dies, broken cement retainers, nipples, collars, short lengths of pipe, swab, and packer rubbers, etc. Run in the hole assembled in a fishing string of drill pipe or tubing, simple top-hole manipulation utilizes controlled surges of the hydrostatic head in the well to literally wash junk into a retainer for removal on the pullout.

An outstanding advantage is that this new Cavins tool can be actuated for any number of high velocity junk pick-up surges on one run of the fishing string. It remains in the hole to "work" junk until *all* junk is picked up. The Cavins Multi-Surge Junk Snatcher has gained wide acceptance as a *proven* method for removing junk prior to running diamond bits in coring or making hole through extremely hard formations. It gets *all* junk, large *or* small!

Here's the Record . . .

COMPANY: Superior Oil Co.	STATE: California
WELL: #1 Limoneira	FIELD: Saticoy-Ventura
FISH: 6 slips—pieces Cast Iron—Rubber—etc.	DEPTH: 11,162 feet
CASING: 9⅝"—54#	FLUID—Mud 74#
STRING: 4½" R.F.I. Drill Pipe	BASKET: 8¼" w/Drag Shoe
MAIN VALVE DEPTH: 8072 feet	BYPASS VALVE DEPTH: 8072 feet

REMARKS: Fish was drilled up and laying on cement bridge at 11,162 feet in 9⅝" Casing. Ran 8¼" basket with 120 feet of drill collars and 2970 feet of drill pipe below Main and Flow Control Valve Sections with 4½" By-pass Valve directly below Main and Flow Control Valve Sections.

First Run: Surged tool 22 times and recovered all the slips and approximately 60 lbs. of cast iron and rubber.

Second Run: Surged tool 33 times recovering several pieces of hard cement, indicating hole was cleaned out on one run of tool. Drilling resumed.

SIGNED: Jesse Eubanks
Cavins Service

Here's how the CAVINS Multi-Surge Junk Snatcher Works . . .

Following assembly in the fishing string and after preliminary rotation to break or center junk, hydrostatic head surges to carry junk into the tool are made by slacking off weight on the fishing string. As weight is slacked each assembly of the Cavins Multi-Surge Junk Snatcher functions in the following manner.

1. **By-Pass Valve (C) closes to seal off side-wall ports.**
2. **Main Control Valve (A) opens the string to atmosphere which causes a high-velocity fluid head surge up through the junk basket (D) at the bottom of the well.**
3. **At the same time a Floating Valve in Flow Control Valve (B) limits volume of surge to approximately one barrel of fluid. Pick up on the fishing string closes the Main Control Valve (A) and floating valve in Flow Control Valve (B) floats down off its seat in position for repeated surges.**
4. **Upper and Lower Junk Baskets (D) receive and retain all junk washed into them with each surge.**

Each complete surge cycle of the Cavins "Multi-Surge" Junk Snatcher is instantaneous. The operator need only pick up the fishing string to ready the tool for repeated surges.

AVAILABLE IN 3 SIZES

The Cavins "Multi-Surge" Junk Snatcher is available in three basic fishing string sizes, 3¾", 4⅝", and 5¾" with Junk Basket Assemblies ranging up to 9⅝" in diameter. Write for the Cavins "Multi-Surge" Junk Snatcher folder. It illustrates and explains principle of operation, arrangement and function of each assembly in the fishing string—gives overall dimensions and cutaway views of all operating parts plus the address of your nearest Cavins Service Branch.

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As wells go deeper and deeper, every piece of drilling equipment must be designed for heavier duty, with an extra factor of strength to provide for unexpected conditions. The *improved* **CHIKSAN All-Steel Rotary Hose** is built to meet today's requirements...and to anticipate tomorrow's demands. It provides uniform strength from mud pumps to well bottoms.

The *improved* CHIKSAN *Rotary Hose* is made up with pipe sections the same size and weight as the drill pipe. This means uniform safety *all* the way.

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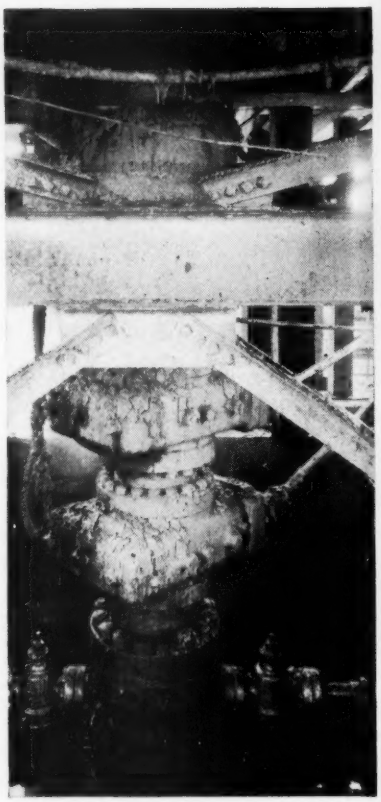
BALL-BEARING SWIVEL JOINTS FOR ALL PURPOSES



Blowout-preventer installation at 1 Limoneira

acter and were due in each case to sticking of drill pipe. McCullough jars were used in the drill pipe string below 17,159 ft. as a precautionary measure. The last instance of stuck drill pipe occurred at 18,136 ft. Although the jars were then operated continuously for 22½ hours, the fish would not come loose, presumably due to the fact that drill collars were not used above the jars for additional weight. To correct this, the safety joint below the jars was released and the drill pipe pulled from the hole. Nine 6-in., 40-ft. drill collars were then put on above the jars and the complete assembly lowered into position again and the safety joint reengaged. After 8½ hours of additional jarring, and by spotting oil, the pipe was successfully jarred loose. This was the most time-consuming fishing job in the entire drilling of the well and required 3 days to complete.

Slight Deviation from Vertical

An important factor in the excellent time made in drilling and the comparative freedom from trouble was, in part, the small deviation of the hole from the vertical. Maximum deviation of 3° occurred at 9,087 ft. The total drift was 385 ft., an accumulation of all the single shots. At 16,660 ft. the deviation was only 1.5°.

No problem due to high temperature was encountered in making subsurface readings. The Schlumberger electrical logging device was run at a

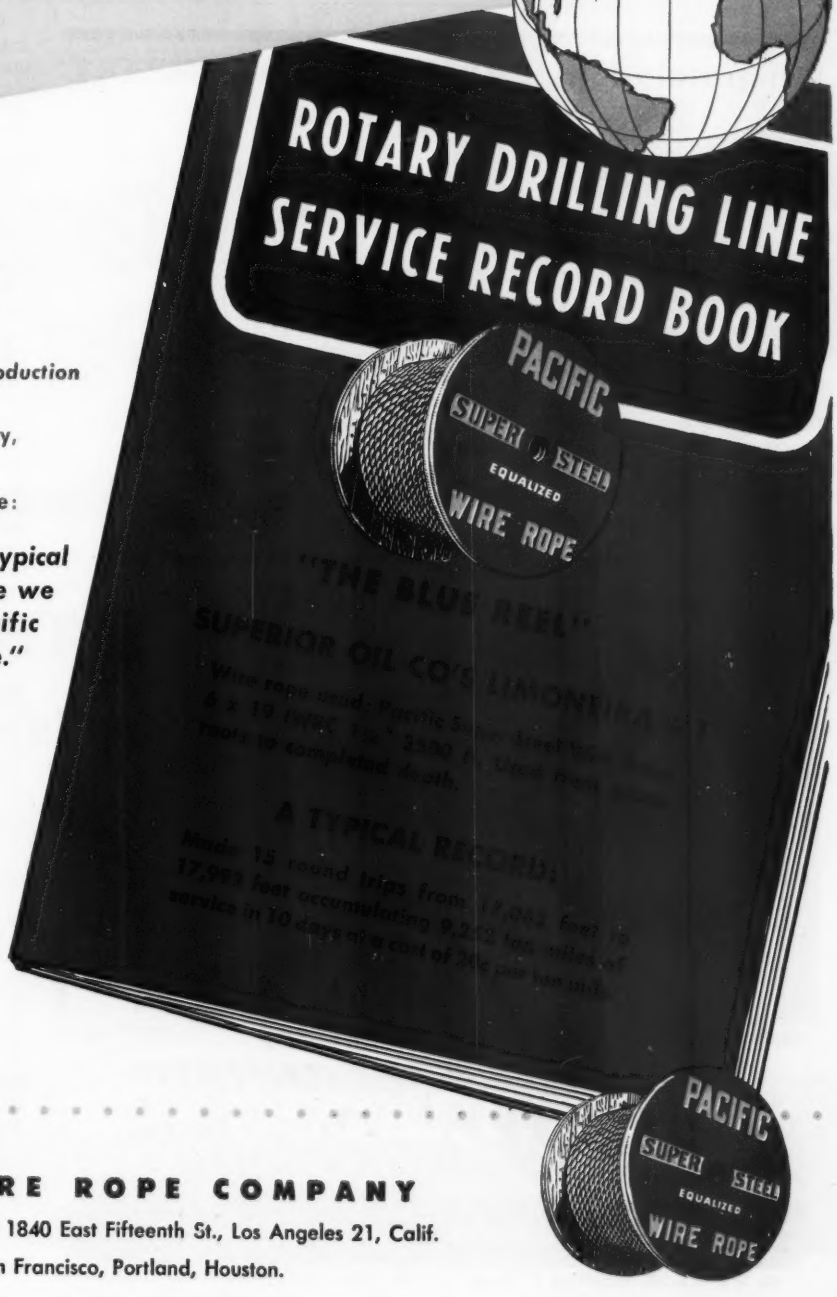
THE DEEPEST WELL IN THE WORLD

DRILLED BY

THE SUPERIOR OIL CO.

WITH THEIR *OWN* EQUIPMENT

March 1949



HERE IS WHAT JOHN C. CODY

Vice President in Charge of Production
(PACIFIC DIVISION)

The Superior Oil Company, has to say about Pacific Equalized Wire Rope:

"This outstanding record is typical of the consistent service we are getting from Pacific Equalized Wire Rope."

PACIFIC WIRE ROPE COMPANY

General Offices and Factory: 1840 East Fifteenth St., Los Angeles 21, Calif.

Branches: San Francisco, Portland, Houston.

This Superior crew look pleased, at the 18,734-ft. mark: Mel Uffen, drilling foreman; B. S. Perris, driller; W. MacDonald, floorman; Steve Staley, floorman; H. Stepp, derrick man; C. Davis, floorman

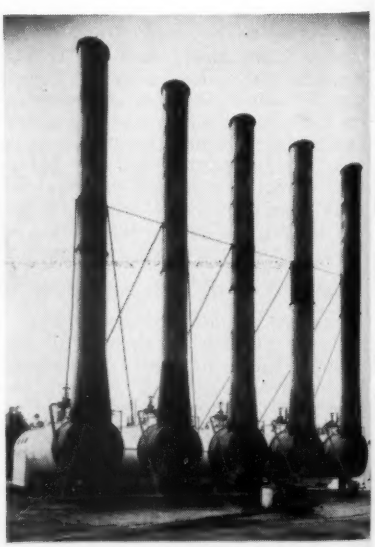
depth of 18,109 ft., one of the several new records made on this well. With temperatures approximating 250° there was obviously no trouble from heat. In contrast to the comparatively "low" temperatures in the Superior well, there are records of about 300° in 10,000-ft. deep wells at Signal Hill and in 8,000 or 9,000-ft. wells in other areas where wells are bottomed in Schist, notably at Del Rey.

Speed Cut to 70-80 R.p.m.

While rotating speeds varied during the course of drilling, the tendency was to "take it easy" during deeper drilling and in the last weeks of the operation the speed was cut to 70 to 80 r.p.m. Superior is understood to rotate as high as 400-450 r.p.m. on its development wells where it is fully familiar with conditions.

With reference to wire lines, it is interesting to note that while 1¼-in. line was used on this well, Superior's experience on its new Wyoming world's record well has demonstrated the feasibility of using 1½-in. line; and the service life of the larger line appears to compare favorably with 1¼ and 1⅛-in. lines used on smaller rigs.

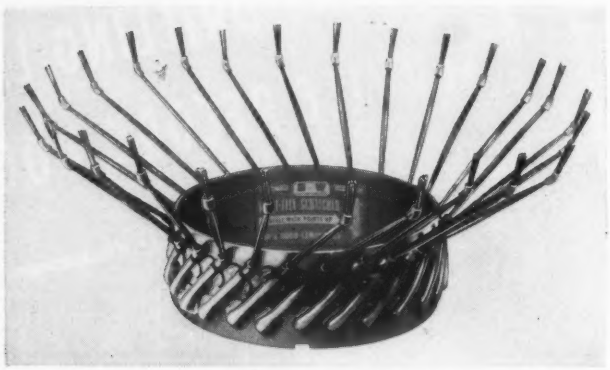
Last figures released by Superior on the weight of the drilling string on the Ventura County deep well was at 18,000 ft. when the weight was 340,000 lb. with the pipe suspended in 82-lb. mud. This figure takes in the drill pipe, drill collars, and traveling assembly. With 10 lines up, the static load per line was therefore 34,000 lb.



Lineup of the five 130-hp. 500-psi. all-welded boilers, with stack blowers

Congratulations, SUPERIOR OIL COMPANY

on drilling Limoneira No. 1



The 9-5/8" casing in this record depth well was equipped with

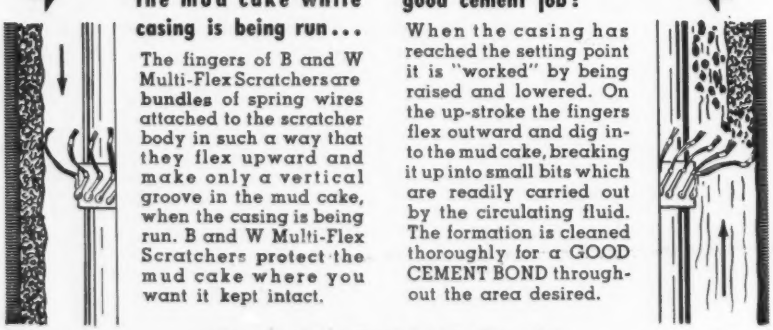
B and W MULTI-FLEX SCRATCHERS

1 The Flexible Fingers protect the mud cake while casing is being run...

The fingers of B and W Multi-Flex Scratchers are bundles of spring wires attached to the scratcher body in such a way that they flex upward and make only a vertical groove in the mud cake, when the casing is being run. B and W Multi-Flex Scratchers protect the mud cake where you want it kept intact.

Remove the mud cake for a good cement job! 2

When the casing has reached the setting point it is "worked" by being raised and lowered. On the up-stroke the fingers flex outward and dig into the mud cake, breaking it up into small bits which are readily carried out by the circulating fluid. The formation is cleaned thoroughly for a GOOD CEMENT BOND throughout the area desired.



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QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

What Is a Good Fluid Catalyst?

What physical properties determine the suitability of a catalyst for use in the fluid process? How are these properties determined and what happens to the catalyst during operation? C. B. T.

The prime physical requisite of a fluid cracking catalyst is the ability to be fluidized or "fluffed up" by aeration. This determines whether or not the catalyst will "stand up" in the bed and it also indicates whether it can be circulated. Operators are not in harmony as to what makes a good catalyst, but particle-size distribution and density are the two physical properties most closely watched during operation (excluding, of course, "activity" which might be termed a chemical property). In a most general way, the 0-80μ material should be kept above 50 per cent (preferably 75) and the 0-40μ material above 15 per cent (preferably 25).

Determination of the size distribution of the particles involves making a sieve analysis (A.S.T.M. E 11-39) to separate the particles into broad size groups, and then to analyze the 0-88μ size mixture (passes 200 mesh) by the special methods that are described below. The relationship of screen size to particle size was discussed on this page in the March 17, 1949, issue.

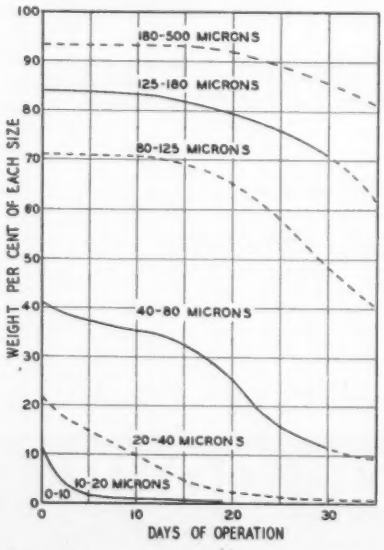

Fig. 1—Micron distribution of one natural (fluid) catalyst during 30 days of operation. (Also see Fig. 2)

The sedimentation method[1] involves suspending a small amount (about 1 per cent) of catalyst in a liquid (preferably isopropyl alcohol) and noting the variation in weight of a plummet as settling of the powder proceeds. From the resulting curve the particle-size distribution is calculated using Oden's method of tangential intercepts.[5] When the data are plotted on probability graph paper (size vs. cumulative weight per cent), straight lines usually result, which means that the distribution of particle sizes follows the so-called normal or Gaussian distribution law. The average particle size can then be estimated from the 50 per cent point on the curve. The method is described by Martin.[3]

The air elutriation method developed by P. S. Roller[4] involves subjecting the catalyst to progressively different air-velocity streams, which carry particles upwards as a function of Stokes law. The modified Roller method now widely used is described by Matheson.[2] The separated particles are then weighed to obtain weight per cent. The equipment is designed to give the following fractions:

wt. % 0-10μ
wt. % 10-20μ
wt. % 20-40μ
wt. % 40-80μ
wt. % 80μ plus (remainder)

Opinion varies as to the most desirable micron distribution. However, Table 1 indicates various catalysts noted in the literature and in operating units. The particle-size distribution ranges from 100 per cent to 0 to 40μ material to nearly 90 per cent of 40μ-plus material, the latter generally considered to be a nonoperable catalyst. The results are given in cumulative weight per cent and hence the percentages of fractions can be obtained by difference.

Fig. 1 shows how the natural catalyst E lost its fines and became heavier during a 30-day operation when makeup of new or reground catalyst was not sufficient to overcome stack losses. The data are smoothed and indicate that lighter fractions are lost first. In this particular operation the catalyst was not very good after 10 days and operation was difficult at 20 days.

Another criteria of fluidity of catalysts is density. The particle itself may have a density varying from 1.9 to 2.3 specific (119 to 144 lb. per cu. ft.) gravity, but in vessels the catalyst exists in an aerated state so that bulk densities are much less. If considerable fines are present (as in a freshly ground catalyst) the aerated density will be low as compared to a similar catalyst without fines. Three densities may be reported: (1) **Loose:** The loose density is obtained by rolling a weighed sample of catalyst in a standard cylinder and noting the maximum volume. (2) **Settled:** The settled density is obtained by measuring the volume after the loose catalyst has stood for a given period (say 15 minutes), without being disturbed. (3) **Compacted:** This density is obtained by noting the minimum volume after the settled catalyst has been tapped until its volume is constant. Although density measurements are somewhat empirical, they can be easily conducted in the laboratory

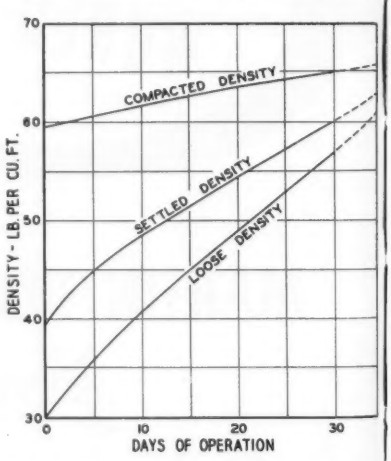

Fig. 2—Change of density for one natural catalyst during a 30-day run. (See also Fig. 1)

TABLE 1—VARIATIONS OF PARTICLE DISTRIBUTION IN TYPICAL F.C. CATALYSTS

Particle size, microns	Cumulative weight per cent of each size for these catalysts									
	A	B	C	D	E	F	G	H	I	J
0-10	75	60	0	5	12	1	1	...	...	...
0-20	95	85	0	15	22	5	3	10	1	13
0-40	100	95	50	25	41	30	17	25	12	24
0-80	...	100	100	75	71	75	56	50	48	40
0-125	...	...	...	...	84	93	...	...	71	...
0-180	...	...	...	100	93	99	95	...	86	...
0-500	...	...	...	...	100	100	100	100	100	100

A and B	commercially available, but expensive
C	theoretically desirable, but expensive
D	commercially available at moderate expense
E	average of commercially available at average cost
F	used catalyst, similar to D sample, when new
G and H	samples cited in the literature
I	used catalyst, similar to E when new (now too coarse)
J	sample cited in literature (also probably too coarse)

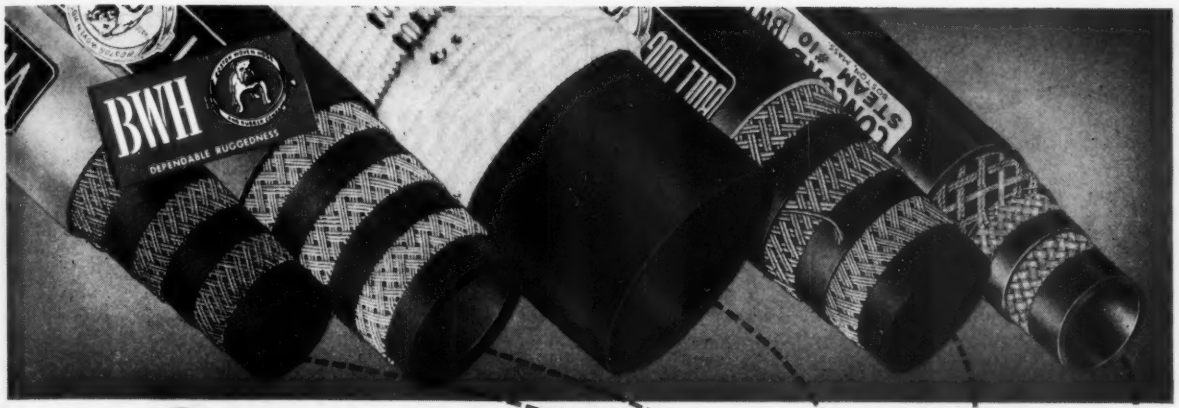

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Fig. 2 shows how the densities of catalyst E changed during the same 30-day operation as shown in Fig. 1.

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West Burkburnett Field Water-Flood Project

(Continued from page 89)

production for the year prior to the development of a water-flood project was 40 bbl. of oil and 2 bbl. of water per day.

The production was increased to 52 bbl. of oil per day after the drilling of eight wells on the lease, but the production decreased to 32 bbl. of oil per day when seven of the producing wells were converted for water injection. The oil production increased from 32 to 59 bbl. per day from July 1944 to January 1948. This is a net increase of 27 bbl. of oil per day in 3½ years. There was no increase in water production.

In January 1948 one of the producing wells was converted for water injection. From January 1948 to April 1949 the production increased from 59 to 283 bbl. of oil per day. This is a net increase of 224 bbl. of oil per day in 15 months. Daily peaks of production have been as high as 320 bbl. of oil per day, and production rates from 400 to 450 bbl. of oil per day are expected before the end of 1949. It should be noticed that there has been no appreciable increase in water production to date.

The cumulative recovery prior to water flooding the lease was 629,673 bbl. for the 157 original productive acres. This is a recovery of 4,011 bbl. per acre. The cumulative recovery since water flooding has been 129,000 bbl. of oil. It is estimated that 50,000 bbl. of the oil recovered, since the start of water-flood operations, would have been recovered by primary methods; and 79,000 bbl. of the oil is credited to water flooding. Based on the 138 effective water-flood acres, there has been a recovery of 934 bbl. per acre since water injection was started. Based on the per acre recovery, this is approximately 23 per cent as much oil as had been recovered prior to water flooding.

Water Injection

Water-injection rates are based on the net sand thickness present in the water-input well. The average initial rates of injection were approximately 4 to 5 bbl. per day per foot of sand. However, as the project continued, average injection rates were increased to approximately 8 bbl. per day per foot of sand. Since additional input water is not available at the present time, increased rates have not been possible.

Cumulative water injected to April 1, 1949, is 909,000 bbl. Approximately 7 bbl. of water has been injected for every barrel of oil produced since the water flood was started. The first major increase in oil production occurred approximately 3½ years after water injection was started. At this time, it was estimated that approximately 71 per cent of the void space in the reservoir had been filled with input water. The estimated void space in the reservoir is the sum of the cumulative oil production, cumulative water production, and the shrinkage of the oil in place. As of April 1949 the estimated void space filled by input water is 96 per cent. Since the void space was 71 per cent filled with input water, any major change in the daily water injected resulted in a change in the daily oil production.

WATER ANALYSIS—J. G. GOINS LEASE, WEST BURKBURNETT FIELD, WICHITA COUNTY, TEXAS

	P.p.m.	Equivalent p.p.m.
Silica	420.00	.....
Fe and Al oxide	368.00	.....
Magnesium	2,234.67	183.69
Calcium	10,943.26	546.07
Sodium	.....	2,080.57
Carbonates	0.00	0.00
Bicarbonates	24.84	0.41
Sulfates	57.61	1.20
Chlorides	99,600.00	2,808.72
Hydroxides	.....	.....
Total solids weighed	152,480.00	.....
CO_3 and HCO_3 burned	24.84	.....
Suspended solids	.....	.....
Total	152,504.84	.....
Free CO_2, p.p.m.		89.81
Nonincrusting solids, lb./1,000 gal.		1,014.39
Incrusting solids, lb./1,000 gal.		332.24
S. G.		1.116
pH		5.6

Development Program

Drilling. — The West Burkburnett field water-flood project is to be developed during a 3-year period. Eighty-five wells will be drilled to develop the project. At the present time, the second year's drilling program is in progress. The producing and water-input wells are being drilled on 10-acre spacing, and several of the abandoned well locations are being redrilled in order to develop the water-flood pattern. The water-supply wells are to be drilled on 160-acre spacing.

There is an 800-ft. producing sand in the southwest part of the pool, and core data are to be obtained on the sand as the deeper wells are drilled. If the 800-ft. sand proves to be favorable for water flooding, it is possible that the same wells may be utilized at a later date to water flood this sand.

The wells are being drilled with rotary tools and core data are being obtained on all wells. All water-input wells are to be cored with a rotary using a high-water-loss mud. All producing wells are to be cored with cable tools in produced oil. It is the opinion of the author that the core data are necessary in order to study and regulate an efficient water-flood project.

When the project is completely developed, there will be 102 producing wells and 97 water-input wells on a five-spot pattern. There will be approximately 1,680 acres within the effective water-flood limits. The estimated effective water-flood limits is a line connecting all operating wells on the edge of the field.

Completion practice.—All wells are to be completed with the casing set on top of the Gunsight sand. Four-inch line pipe is to be used for casing in the water-input wells. The producing formation in all injection wells is to be shot with 1 to 2 qt. of nitroglycerin per foot of sand. The information obtained from the pilot water-flood project was that the injection wells would take more water with less pressure if the wells were shot. It is the opinion of the author that on a 10-acre spacing pattern that shooting of the input wells will not be conducive to channeling of input water. However, it is possible that on a closer spacing pattern, shooting of the input wells may channel injected water to producing wells. The producing wells are not shot on completion.

Since the casing was not cemented in the wells drilled during the original development of the field, a liner is to be cemented on top of the sand in all wells to be converted from producing wells to water input wells.

The producing wells are completed using 7-in. casing. Two-inch line pipe is used for tubing, and most of the wells are equipped with pumping jacks connected to the central powers located in the field. No tubing or packers are used in the injection wells, and the water is injected directly into the casing. Very simple surface connections are used on the water-input wells. All water-input wells are equipped with a water meter and a regulating valve.

The water-supply wells are completed by cementing 7-in. casing through all formations showing water, and gun perforating the water-bearing sands as indicated on the electric log. Two-and-one-half and 3-in. tubing has been used in the water-supply wells. At the present time, individual pumping units are being used to produce the water. In the near future, an electric centrifugal pump is to be

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used on one of the water supply wells.

Water-Input System

Water source and distribution.—There is approximately 150 ft. of water sands between 0 and 1,700 ft. in the water-flood area. The water analysis indicated 99,600 p.p.m. of chlorides. It should be noticed that the permeability of the sand to water with this chloride content is approximately 73 per cent of the permeability of the sand to air. The water has been satisfactory and requires no treatment before injection; however, iron oxide does precipitate out in the distribution lines. The water-distribution lines and injection wells are acidized with a 15 per cent solution of HCl acid to dissolve the precipitate when intake capacity decreases below desired rates of injection.

At the present time, some fresh water is used for injection; however, as additional salt-water supply wells are drilled, the use of fresh water will be discontinued. The estimated total water to be injected, after complete development of the field, is 6,000 to 10,000 bbl. per day.

The water system on the pilot water-flood project is a closed system with gravity distribution lines. The water is pumped from the wells to a storage tank with an oil seal on top of the water. Gravity distribution lines are connected from the tank to the injection wells. The water system for the field is to be a closed system with gravity distribution; however, the water-supply wells are to pump directly into the water system at a point nearest the water-supply well. The main line through the field will be 6-in. pipe, and the main laterals will be 3-in. pipe. One-and-one-half-inch laterals will be connected to the injection wells. The storage tanks for the system will be surge tanks for any excess water that is produced and not used for injection. Automatic liquid-level controls will be installed on the storage tanks to regulate the amount of water required from the supply wells.

Protective coatings.—Three-inch transite pipe was used for the main water-distribution line on the pilot water-flood project to prevent corrosion. The main disadvantage of this type of line is that it cannot be used in a pressure system. At the present time, the pilot water-flood project is not under pressure; however, it is possible that pressure will be required at a later date.

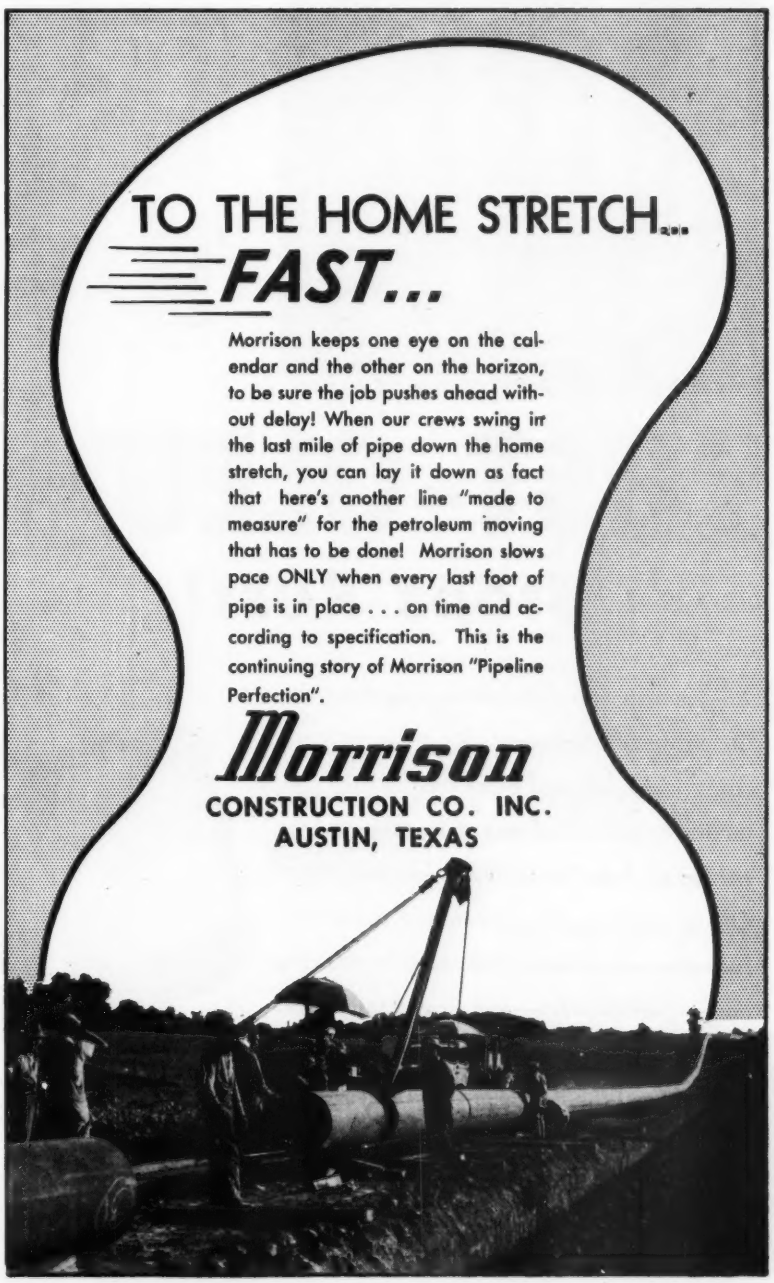
The water system to be installed for West Burkburnett field is to be a plastic-coated pipe. The pipe is to be sandblasted, cleaned with a carbon tetrachloride solution, and plastic coated. The outside is to be covered with a bitumastic coating to protect against soil corrosion. All electric centrifugal pumps are to be coated with plastic since they will be submerged in the salt-water supply wells.

At the present time, no corrosion has been observed on sucker rods and tubing in the producing wells; however, corrosion of the subsurface pumps, rods, and tubing will probably develop when it becomes necessary to produce large volumes of water.

Operating Practice

It is the opinion of the author that the personnel caring for a water-flood project is a very important factor in operating and regulating an efficient water injection program. Accurate data on operations are a necessity for evaluating the results obtained.

Portable testing units are used in West Burkburnett field to obtain periodical tests on producing wells. The testing of the wells often indicates that a pump should be pulled, that excessive paraffin may be present in the lines or tubing, or that the well needs cleaning out. The water-injection wells are checked daily to record water meter readings and report possible leaks in the water system. Accurate data on oil production, water production, water injection, and work performed on the lease are recorded daily and submitted to the engineering department. If it is necessary, the sand in the injection wells is backwashed by lowering the static fluid well in the well and allowing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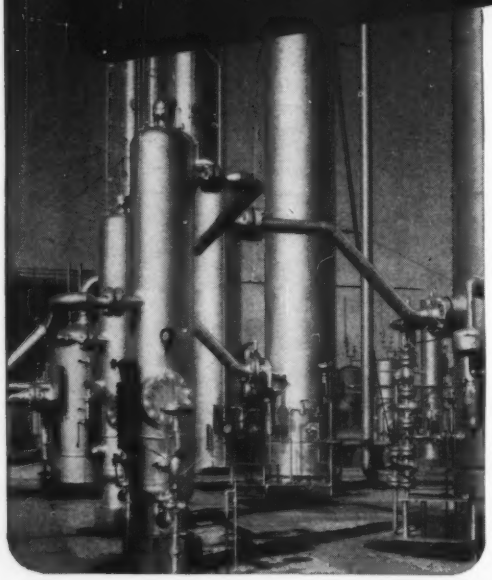

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the water to move from the formation into the well bore.

Some of the producing wells are to be placed on individual pumping units if the central powers are overloaded as a result of the expected increase in fluid production. A gathering system is to be installed to return all produced water to the water input system.

Cooperative Water-Flood Agreement

A cooperative water-flood agreement has been submitted to the offset operator to water flood equitably across lease lines. The agreement stipulates that each operator is to have an equal number of water-input wells along the property line and that agreement is to be reached by an engineering committee on injection rates for offset wells.

Conclusions

The West Burkburnett field water flood project will be the largest pattern water flood in North Texas, and the development and operation of the field will be observed as a possible guide to further development of water flooding in this area.

The necessity for obtaining data on geology, production history, reservoir properties, and source and characteristics of water is emphasized in the evaluating of a water-flood project. Completion and development practice should be outlined in order to reduce the cost of developing a water flood project. Cooperative water flooding within a field is another factor to be considered in maintaining equity and increasing the total recovery of oil. After a field has been developed for water flooding, one of the most important factors in the results to be obtained is good operating practice.

Acknowledgment

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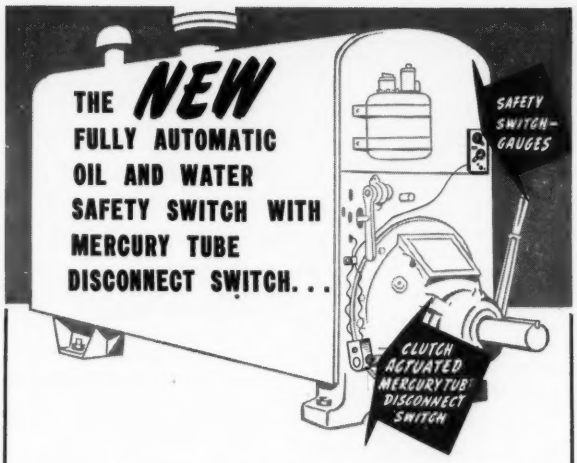

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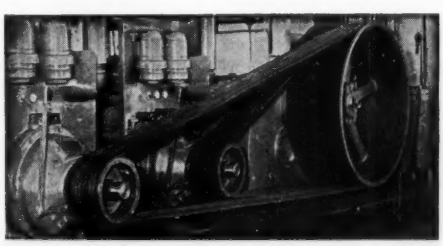

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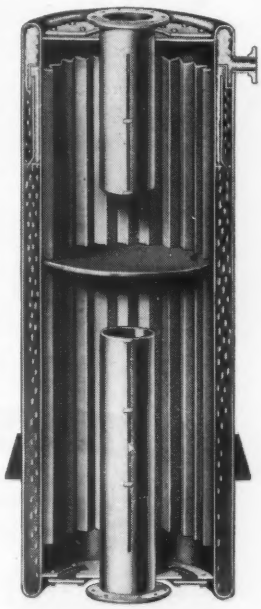

BULLETIN ON REQUEST

THE MAXIM SILENCER CO.
98 Homestead Ave.
Hartford 1, Conn.

BE SURE IT'S A
MAXIM

Bottom-Hole-Pressure Buildup Curves

(Continued from page 92)

plotted on regular coordinate paper against the pressure P_1 at the end of that interval and also the buildup rate

$$\frac{P_2 - P_1}{t}$$ over the second interval

against the pressure P_2 at the end of that second interval, and that a straight line is passed through these two points. The equation of such a straight line, according to the fundamental relationships of analytic geometry, is:

$$\frac{P - P_1}{\frac{\Delta P}{\Delta t} - \frac{P_1 - P_o}{t}} = \frac{P_2 - P_1}{\frac{P_2 - P_1}{t} - \frac{P_1 - P_o}{t}} \quad (9)$$

in which $\Delta P/\Delta t$ represents the buildup rate on the vertical axis and P the variable pressure on the horizontal axis. At the intersection of this straight line with the horizontal P axis, the buildup rate $\Delta P/\Delta t$ will have decreased to zero and the pressure P will have reached the static value P_s. By setting $\Delta P/\Delta t = 0$ in the preceding Equation 9, so that $P = P_s$ and after dividing both sides by t, we find:

$$\frac{P_s - P_1}{P_o - P_1} = \frac{P_2 - P_1}{P_2 - 2P_1 + P_o} \quad (10)$$

from which P_s can be determined as:

$$P_s = \frac{P_1^2 - P_o P_2}{2P_1 - P_o - P_2} \quad (11)$$

This is the same relationship as found in Equation 8 and proves that substitution of the daily or hourly pressure increments for the true differentials does not affect the straight-line extrapolation to static pressure P_s as shown in Fig. 3.

In the same manner, it can be demonstrated that plotting the pressure increments against the pressure at the beginning instead of the end of each interval also results in the same static pressure extrapolation as shown by the dotted line on Fig. 3. The slope of the relationship on this chart should represent the productivity factor c, previously defined as pressure buildup in pounds per hour per pounds per square inch differential.

This relates to the productive index I as follows:

$$I = 9.86A/g \quad (12)$$

in which A is the cross-sectional area of the casing, tubing, or annular space in square feet and g is the specific gravity of the liquid. The relationship, of course, applies only in one-phase flow, and when no gas enters the well bore to contribute to the pressure buildup, such as is the case when the well or casing is open to the atmosphere. This slope does represent the true productivity factor only when the time increments are very small so that the true differential of Equation 1 is approached.

Pressure Measurement

The general procedure for measuring pressure increase by the echometer is to shut a well down and to take shots on the fluid level in the annulus at constant intervals of time, ranging up to 1 hour. In case there is any doubt as to the presence of foamy or cut oil in the annulus, the annulus may previously be loaded with clean oil from the tank battery through the flow line. The fluid-level shots are corrected in a conventional manner and converted to bottom-hole pressure at datum level, after correcting for gas pressure and weight of gas column in the casing. The pressure-buildup rate in pounds per square inch per hour is then plotted against pressure and the resultant straight-line trend extrapolated to zero buildup rate in order to find the indicated static pressure.

A survey of one well takes only a few hours and normally the total field survey for 28 wells is completed in less than 2 weeks. When time in-

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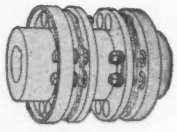
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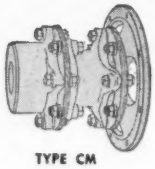
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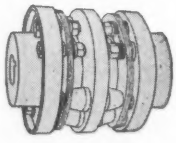
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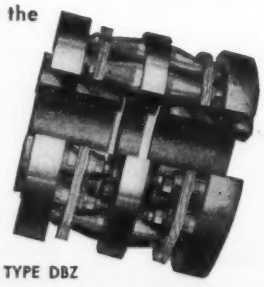
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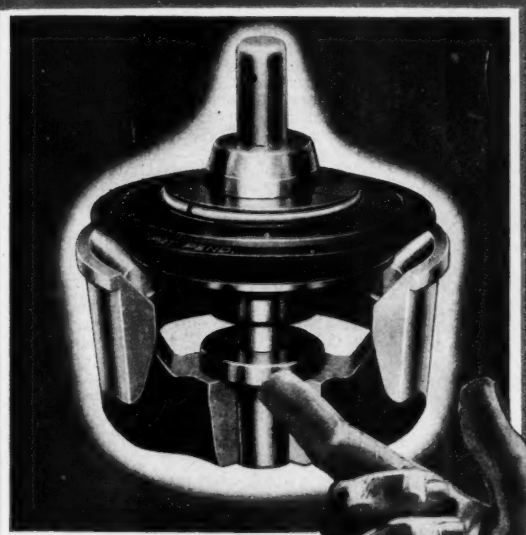

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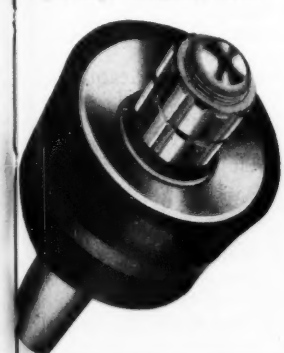
MISSION Slush Pump Pistons give longer trouble-free service



"3 to 10 times as long, without attention!" Can so strong a claim be true?

The figures are confirmed by hundreds of field records. The MISSION "Compound 308" Insert lasts 3 to 5 times as long as regular inserts in ordinary mud, and up to 10 times as long as ordinary oil-resisting inserts in hot, chemically treated or oil-base mud.

The MISSION Replaceable Valve Seat Bushing works hand in glove with the insert to avoid interruptions of drilling. The life of the bushing, which protects the seat from wear, approximately equals that of the insert. When you install a new insert, install a new bushing. This gives you practically a new valve, which should again require servicing only when the insert again wears out.

The MISSION Valve has extra-large sealing surface and ample fluid passage, and operates with top efficiency. It handles with ease even the most difficult muds, including oil-base muds and those containing cotton seed hulls, abrasives, etc. It is guaranteed to prove more economical than others, or money refunded.

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tervals between shots are 30 minutes or longer, wells can be shot in pairs with the unit moving back and forth and staggering the time of the shots. Most wells show an almost perfect straight-line relationship.

Extrapolation for Static Pressure

The extrapolation method works just as well with buildup measurements made with a pressure bomb. Fig. 3 shows the buildup curve for well "A," a South Texas well with low productive index, which was discussed before.

The semilog extrapolation method, as proposed by Muskat, requires a stepwise trial-and-error procedure but is independent of the length of the time intervals between pressure points. The proposed straight-line extrapolation method consists of plotting the buildup rate against the pressure and extrapolating the straight line obtained on coordinate paper to its intersection with the pressure axis. The method is valid only when time intervals are constant. Under these conditions the average buildup rate over fairly long intervals can be used instead of the true instantaneous buildup rate with no effect on the results of the extrapolation. Both fluid level measurements and pressure-bomb readings may be used. Even when the productive index is not absolutely constant, extrapolation of the slightly curved trend to its intersection with the pressure axis is still possible.

Symbols Used

P_s = static bottom-hole pressure in psi.
P = bottom-hole pressure at time t in psig.
P_1, P_2, P_3 = successive pressure observations at the end of each interval.
P_o = initial bottom-hole pressure at time $t = 0$.
t = time elapsed since first pressure measurement in hours.
c = productivity factor or pressure buildup rate in psi. per hour per psi. differential.
I = productive index in barrels per day per psi. differential.
e = base of natural logarithms.
$\log_e$ = natural logarithm.
A = cross-sectional area of pipe in square feet.
g = specific gravity of liquid (water = 1.0).

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Three methods are widely used to prevent corrosion — protective coatings, special alloys and chemical inhibitors. Each has special merit under certain conditions; but, when water, quiescent or recirculating, remains in contact with ordinary metals, a chemical inhibitor is generally indicated.

Mutual chromates are used extensively as corrosion inhibitors. In most instances surprisingly small amounts are required to prolong indefinitely the life of the exposed metal. These applications include: recirculating spray systems for air washing and conditioning, cooling systems for internal combustion engines, refinery condensers and heat exchangers, oil well drilling muds, slushing compounds and water-soluble cutting oils, gasoline pipe lines, refrigerating brines and sealed-in absorbents for unit refrigerators.

If these uses suggest a possible application for chromates in your operations, our Research Department will be glad to collaborate with you.

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Potassium Bichromate — Potassium Chromate

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Hypersorption

(Continued from page 97)

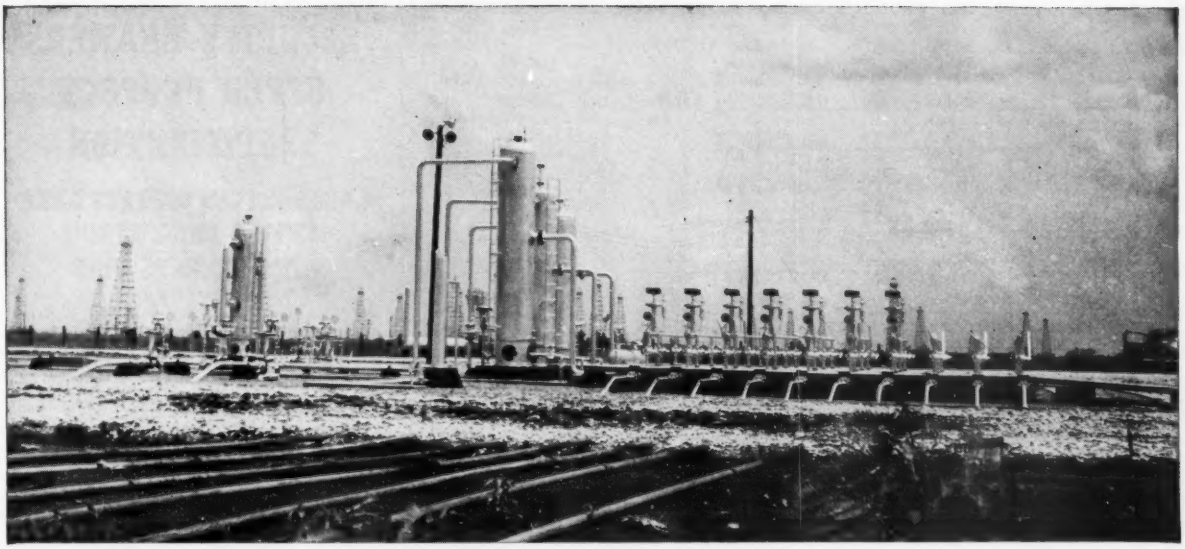
hypersorber processes approximately 1,800,000 standard cubic feet per day of gas at 75 psi., and employs a carbon circulation of 18,000 lb. per hour and a carbon stripping temperature of 500° F. The unit is approximately 85 ft. high and 4½ ft. in diameter. A vertical bin 4 ft. in diameter, 60 ft. high, provides storage facilities for the carbon charge during shutdown.

The separation effected in this unit is given in Table 3.

This plant has consistently recovered approximately 98 per cent of the ethylene in the feed stream. A study of the material balance indicates that the small loss which occurs is entirely in the purge gas flow. The ethylene content of this stream is due to leakage of lift gas blower seal gas which has the same composition as the feed to the unit.

One of the major applications of Hypersorption is the recovery of propane and butanes from natural gas. Due to the high adsorptive attraction of activated carbon for these hydrocarbons, it is possible to process gas streams containing as little as 1½ volume per cent of propane and effect of 98 per cent recovery of the propane and heavier material. A material balance showing product compositions for a typical propane recovery application is presented in Table 4.

In this operation three product



Field Installation for the Conservation of NATURAL GAS

This Texas Gulf Coast installation designed by Maintenance handles ten wells. Oil and gas flow from the lease into the ten selective manifolds, thence to separators suitable to working or flowing pressure. The gas separated in these units goes into a gathering system, is compressed and reinjected into the formation, eliminating flares and gas waste.

In this installation, the 125-lb. W.P. separator is so arranged with gas meter runs and oil meters that, with selective valving on the selective manifold, any well on the lease can be tested. Each separator is equipped with a Smith positive displacement oil meter that registers the total production of wells flowing into this separator, thereby relieving the producer from actual tank gauging, except for periodic checks.

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EQUIPMENT WITH ENGINEERING SERVICE

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HOUSTON 1, TEXAS
L. D. 409 P-3135

MECO

TABLE 3—FEED AND PRODUCT COMPOSITIONS, MATERIAL BALANCE

Comp.—	Feed gas S.C.F./hr.	Feed gas Mol %	Make gas S.C.F./hr.	Make gas Mol %	Discharge gas S.C.F./hr.	Discharge gas Mol %	Purge gas S.C.F./hr.	Purge gas Mol %
H_2	29,400	39.8	....	....	14,200	31.6	15,200	61.8
N_2	1,240	1.7	....	....	630	1.4	610	2.5
CO	670	0.9	....	....	350	0.8	320	1.3
O_2	100	0.1	5	0.1	45	0.1	50	0.2
CH_4	37,900	51.3	....	....	29,600	66.1	8,300	33.7
CO_2	150	0.2	130	2.9	....	....	20	0.1
C_2H_2	160	0.2	160	3.6	....	....	....	....
C_2H_4	4,250	5.8	4,150	92.7	....	....	100	0.4
C_2H_6	30	Trace	30	0.7	....	....	....	....
Total	73,900	100.0	4,475	100.0	44,825	100.0	24,600	100.0

TABLE 4—PROPANE RECOVERY MATERIAL BALANCE

	Mol per cent Feed	Overhead product	Propane side cut	Bottom product
CH_4	78.1	81.5	....	....
C_2H_6	13.4	18.30	0.4	....
C_3H_8	6.9	0.2	96.4	0.8
C_4H_{10}	1.3	....	2.9	81.1
C_5+	0.3	....	0.3	18.1
Total	100.0	100.0	100.0	100.0

streams are taken from the hypersorber. The propane is recovered as a side cut which is essentially ethane-free and contains only about 3 per cent butanes and heavier. It is directly usable as L.P.G. without further fractionation. Thus the Hypersorption unit performs the same functions as an absorber, stripper, deethanizer, and depropanizer in a conventional oil-absorption plant. Specifications for the hypersorber column for this application are given in Table 5.

TABLE 5—HYPERSORBER FOR PROPANE RECOVERY FROM NATURAL GAS

Feed, M.s.c.f. per day	60,000
Operating pressure, psig.	325
Hypersorber:	
Diameter, ft.	10.2
Height, ft.	146
Carbon charge, lb.	136,000
Carbon circulation, lb. per hr.	225,000

Removal of Nitrogen From Natural Gas

Another promising application of the Hypersorption process is the removal of nitrogen from natural gas. A material balance of such a plant is given in Table 6.

TABLE 6—MATERIAL BALANCE N_2 REMOVAL FROM NATURAL GAS

First Hypersorber

	Mol per cent Feed	Overhead	Side cut	Bottoms
N_2	29.6	33.5	....	....
CH_4	58.6	66.3	.4	....
C_2H_6	6.1	0.2	99.1	.5
C_3H_8	4.6	....	.5	80.2
$C_4H_{10}+$	1.1	....	....	19.3

Second Hypersorber

	Mol per cent Feed	Overhead	Bottoms
N_2	33.5	99.0	.8
CH_4	66.3	1.0	98.9
C_2H_6	0.2	....	.3

The natural gas is first processed in a three-product hypersorber in which an overhead product of methane and nitrogen, a side cut of ethane, and a bottoms product of propane and heavier are produced. The overhead of methane and nitrogen is then fractionated in a separate hypersorber to produce nitrogen as an overhead product and methane as a bottoms product. The ethane from the first hypersorber is combined with the methane to give the desired nitrogen-free natural gas at a minimum in utility consumption and capital expense.

If a butane-free propane is desired, the first hypersorber may be designed to produce four products: an overhead of methane and nitrogen, a first side cut of ethane, a second side cut of propane, and a bottoms product of butanes and heavier. This may be accomplished with relatively minor additional expense.

Processing of Refinery Gas Streams

One of the most valuable applications of Hypersorption is in the processing of refinery gas streams for the recovery of propane, ethane, and ethylene. An example of such a plant employing ethane cracking to produce propane and high purity ethylene as products is presented in Fig. 4. The components of the feed gas and product streams are presented in Table 7.

Important steps in the cycle of operation of this plant are as follows:

1. Recovery of ethylene and heavier components from refinery gas streams and ethane cracker effluent in the Hypersorption unit to product three product streams consisting essentially of C_1's, C_2's, and C_3's respectively.

2. Separation of ethane-ethylene in a small low-temperature column to provide the recycle stream for ethane cracking.

3. Production of the C_3 fraction directly for use as fuel in other chemical processing operations. This fraction can be cracked for a maximum over-all production of ethylene if desired.

A more recent development in Hypersorption processing for this type of plant involves replacing the low-temperature fractionator by a second Hypersorption unit, permitting recovery of an ethylene product of high purity, and in addition, recovery of the substantial quantity of hydrogen produced in ethane cracking at over

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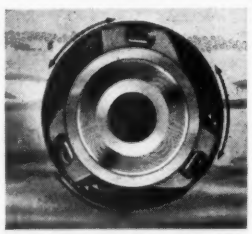

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Cutter teeth shear the formation in an upward direction, which forces reamer downward. This helps remove drill string slack and aids bit action.

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TYPE 1 Cutter is used for all straight reaming operations and for stabilizing in soft formations where bit penetration is rapid.

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How would you drill through this formation?
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Pictured above is a diagrammatic illustration of the Enardo Sample Box installation. It shows how the box, through internal lines, samples three separate levels of the tank FROM THE GROUND. The screw-type valves make sampling easy from any one or all levels of the tank while the simple diaphragm pump quickly restores the samples to storage following analysis. Mounting on a single flange on the side of the tank, the Enardo Sample Box eliminates all walkways thereby saving time and money and cutting down on injuries.

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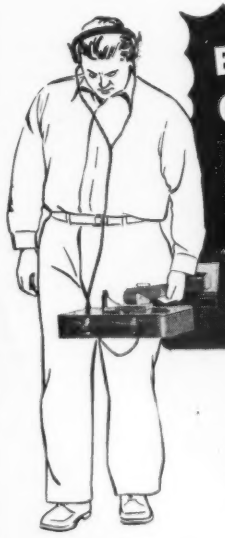

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TABLE 7—HYPERSORPTION PLANT RECOVERING ETHYLENE FROM REFINERY GAS STREAMS WITH ETHANE CRACKING

	Mol per cent					
Comp.—	Refinery gas	Hypersorber feed	Hypersorber discharge	Hypersorber make gas	Hypersorber Side cut	Ethylene fract. overhead
H_2	2.23	11.91	25.40	....	....	....
CH_4	51.55	35.46	73.92	....	0.54	1.35
C_2H_4	3.92	13.24	0.35	1.79	39.32	97.11
C_2H_6	22.58	25.18	0.33	3.44	59.84	1.54
C_3H_6	6.18	4.42	....	29.35	0.16	....
C_3H_8	11.94	8.32	....	54.30	0.14	....
C_4H_{10}	1.60	1.47	....	11.12	....	....

99 per cent purity as a fourth product.

Purification of Hydrocarbon Synthesis Gas

Separation of carbon dioxide and sulfur compounds, such as hydrogen sulfide and carbonyl sulfide in the feed gas to a Hydrocol or Fischer-Tropsch synthesis unit, is a major problem when utilizing coal or low-grade crudes as a primary fuel.

The application of Hypersorption to this problem is illustrated in Table 8.

TABLE 8—PURIFICATION OF HYDROCARBON SYNTHESIS GASES

	Mol per cent		
	Feed	Top product	Bottom product
H_2	52.5	59.0	....
N_2	4.5	5.1	....
CO	29.1	32.7	....
CH_4	1.0	1.1	0.2
H_2S	0.4	....	....
CO_2	12.5	....	96.2
COS—175 p.p.m (2 gr. per 1,000 S.C.F.)			3.6

Acetylene Recovery from Oxidation Gases

The recovery of acetylene from the products of partial oxidation of natural gas for the production of acetylene is an operation which requires a high degree of recovery and has definite limitations regarding allowable pressures and temperatures. Hypersorption handles this problem readily, and its application to this type of operation is illustrated in Table 9.

TABLE 9—ACETYLENE RECOVERY FROM OXIDATION GASES

	Mol per cent		
	Feed	Top product	Bottom product
H_2	48.4	54.4	....
CO	32.3	36.2	....
CH_4	6.0	6.7	0.1
CO_2	4.0	2.5	16.2
C_2H_2	9.2	0.1	82.8
C_2+	0.1	....	0.9

The separation of methane and hydrogen chloride involves a difficult operation when water or similar solvents are employed. Hypersorption easily effects this separation. Results of a typical operation are illustrated in Table 10.

TABLE 10—SEPARATION OF METHANE AND HCl

	Mol per cent		
	Feed	Top product	Bottom product
H_2, N_2	7.1	12.6	....
CH_4	49.4	87.2	0.3
HCl	43.5	0.2	99.7

Purification of Hydrogenation Gases

The recovery of hydrogen from purge gas ammonia synthesis operations has normally been considered very difficult. Hypersorption effects this recovery readily and can produce an essentially complete recovery of the valuable hydrogen from this purge gas as illustrated in Table 11.

TABLE 11—PURIFICATION OF HYDROGENATION GASES

	Mol per cent		
	Feed	Top product	Bottom product
H_2	57.9	75.0	....
N_2	25.1	25.0	25.4
CH_4 + argon	17.0	....	74.6

The application of Hypersorption extends beyond these described above, and includes the separation of hydrogen from a number of contaminants, recovery of ethane from natural gas, and recovery of CO_2 from flue gas. The variety of new gaseous separations now made possible are appreciably extending the field for production of new chemicals and fuels.

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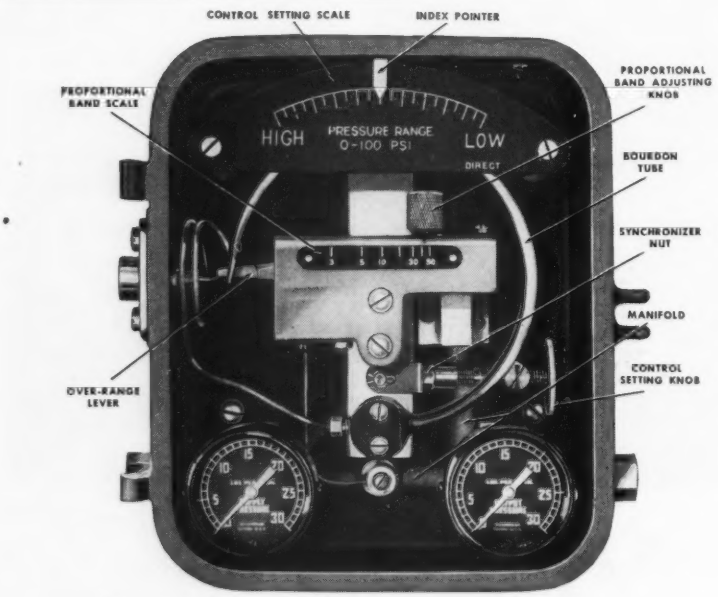
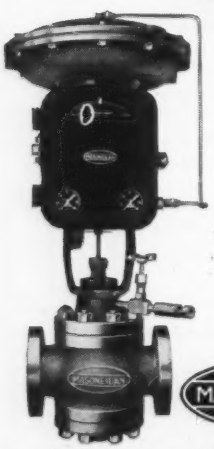
10. Manifold construction prevents transmission of any possible case distortion to control mechanism.
11. Set point indication.





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Survey on Refinery Training Practices

(Continued from page 106)

as to whether refineries are doing more or less, proportionately, than other types of plants. Such deductions are unimportant.

3. The larger plants can rightly be expected to be more active in training because of greater difficulties in coordination and in development of personnel with broad skills, and because of their more consistent filling of replacement needs internally. The availability of fully qualified candidates for employment in the smaller plants reduces training needs accordingly.

4. Training in refineries is expanding. Unlike many war industries which curtailed training after the war, there is ample evidence that the oil companies are placing increased emphasis upon training.

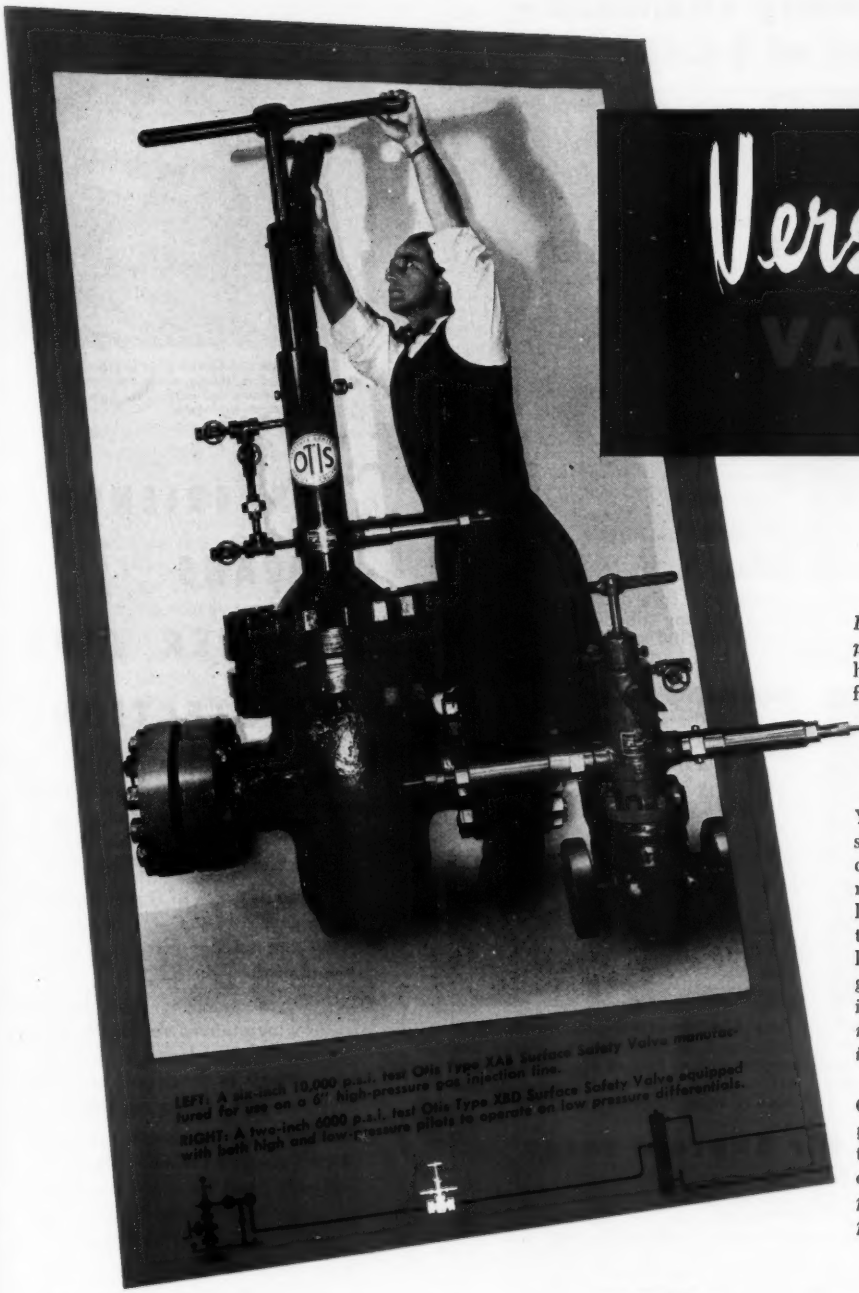
5. Two-thirds of the training men have entered this field within the past 3 years. In turn, they have expressed a need for sources of information and for guidance or instruction as to techniques. Certain instructional texts and materials which are basic to the industry still appear to be needed. Steps to help in this direction by way of items published by universities and associations, including the American Petroleum Institute, have been well received. Further effort seems indicated.

6. The problem of training the trainers remains. Appreciable gain has resulted in one section of the country where these men formed a regional committee for periodic conferences on techniques. Initial experiments by another branch of the petroleum industry point to the possibility of having university-sponsored training institutes to help school the training staffs.

7. Lack of two criteria prevents the obtaining of a proper perspective concerning training in many plants: One is a specific method of isolating individual training needs. The other has to do with a method of specific evaluation of training efforts.

8. Lack of conviction as to the approach which should be made to process training serves to retard activities in that most important field.

9. Training is a tool of management which aims at the savings and gains in efficiency which are possible when the capacity of an individual to produce is increased. The savings in manpower, the better utilization of employe potential, are worth-while objectives. Many a refinery stands to gain by attention to some of the voids indicated herein. Particularly in a cost-reduction atmosphere can training prove its worth.



LEFT: A six-inch 10,000 p.s.i. test Otis Type XAB Surface Safety Valve manufactured for use on a 6" high-pressure gas injection line.

RIGHT: A two-inch 6000 p.s.i. test Otis Type XBD Surface Safety Valve equipped with both high and low-pressure pilots to operate on low pressure differentials.

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Otis Surface Safety Valves consist of an Otis bonnet assembly and either a high-pressure or low-pressure spring-loaded pilot valve, or both, combined with a conventional heavy-duty gate valve body and gate. When line pressure increases or decreases beyond predetermined safety limits, either the high or low-pressure pilot snaps open, exhausts fluid or gas in the chamber beneath the piston to atmosphere, and automatically drives the gate valve down to a positive shut-off. Snap-action protection — the instant you need it!

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View of Pipe Line Service plant at Franklin Park (Chicago suburb), Illinois, where development of better equipment and methods for pipe protection is constantly in progress.

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ENGINEERING fundamentals

Beal's Correlation of Reservoir Oil Viscosity

CORRELATION of the physical properties of reservoir fluids with some easily obtained parameter permits a better estimation of such properties for engineering calculations. Correlations for gas in solution and formation volume factor have been discussed earlier in this series. A correlation for the viscosity of oils at reservoir pressures has been made by Beal[1] and is duplicated here for ready reference. This correlation is based upon the observed fact that the change in reservoir-oil viscosity is due primarily to the change in the amount of solution gas.

The correlation consists of two parts: one to estimate viscosity below the saturation pressure and one to estimate above the saturation pressure. Below saturation pressure two steps are used. Beal's Fig. 8, reproduced here in a simpler form as Fig. 1, gives the viscosity of an oil at a specified reservoir temperature using A.P.I. gravity as a correlation basis. Fig. 2 (Beal's Fig. 9) gives the change in viscosity of an oil at reservoir temperature as a function of the amount of gas in solution.

Above saturation pressure the correlation is based on the viscosity at saturation pressure and the observed fact that the variation of viscosity with pressure is linear above saturation pressure. Beal's Fig. 12 giving this correlation, is here designated Fig. 3.

These correlation charts permit one to estimate a reservoir oil viscosity from a knowledge of the A.P.I. gravity of stock-tank oil, the reservoir temperature, and amount of gas in solution. By using a correlation between gas in solution and pressure the viscosity can be estimated at a given reservoir temperature and pressure from a knowledge of only the A.P.I. gravity of the stock-tank oil.

For example, the viscosity at a reservoir temperature of 150° F. and a pressure of 2,000 psia. for an oil produced as 40° A.P.I. is found by first estimating that the amount of gas in solution will be 680 cu. ft. per barrel of stock-tank oil (Engineering Fundamentals No. 310). Then referring to Fig. 1, the 40° A.P.I. oil at a temperature of 150° F. with no gas in solution would have a viscosity of approximately 1.6 cp. Finally, by reading on Fig. 2 the curve designated 1.6 cp., for 680 cu. ft. of gas in solution the value of viscosity would be about 0.55 cp., the desired estimated quantity.

Beal shows the agreement between actual measured viscosities and those estimated from his correlation for a number of different oils over a wide pressure range.

Reference

1. Beal, "The Viscosity of Air, Water, Natural Gas, Crude Oil, and Its Associated Gases at Oil-Field Temperatures and Pressures," Trans. A.I.M.E. (1946), Vol. 165.

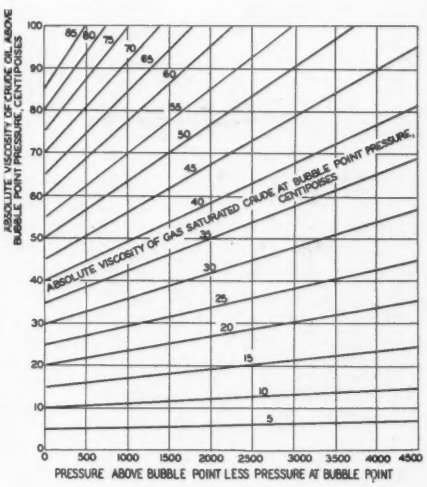

ABSOLUTE VISCOSITY OF CRUDE OIL ABOVE BUBBLE POINT PRESSURE, CENTIPOISES
ABSOLUTE VISCOSITY OF GAS SATURATED CRUDE AT BUBBLE POINT PRESSURE, CENTIPOISES
PRESSURE ABOVE BUBBLE POINT LESS PRESSURE AT BUBBLE POINT

Fig. 3—(Right, and right, below) Crude-oil viscosity prediction above bubble-point pressure. (After Beal, Petroleum Technology, March 1946)

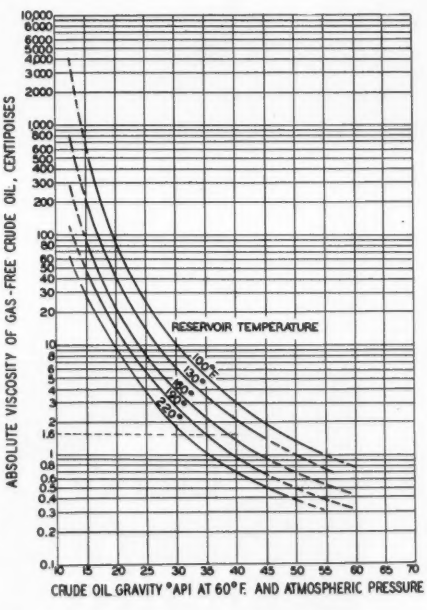

ABSOLUTE VISCOSITY OF GAS-FREE CRUDE OIL, CENTIPOISES
RESERVOIR TEMPERATURE
CRUDE OIL GRAVITY °API AT 60° F. AND ATMOSPHERIC PRESSURE

Fig. 1 (After Beal, Petroleum Technology, March 1946)

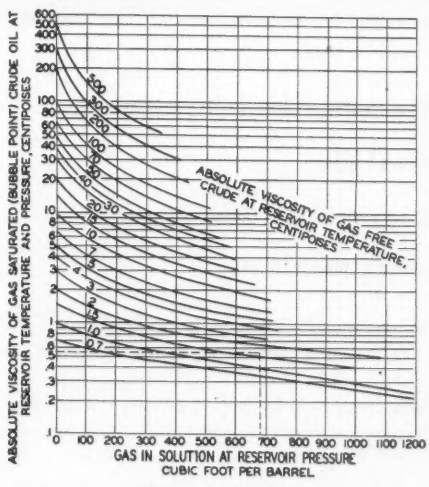
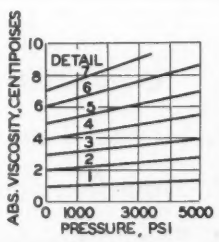
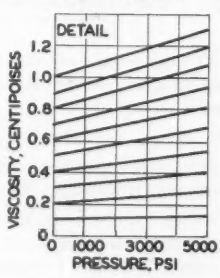
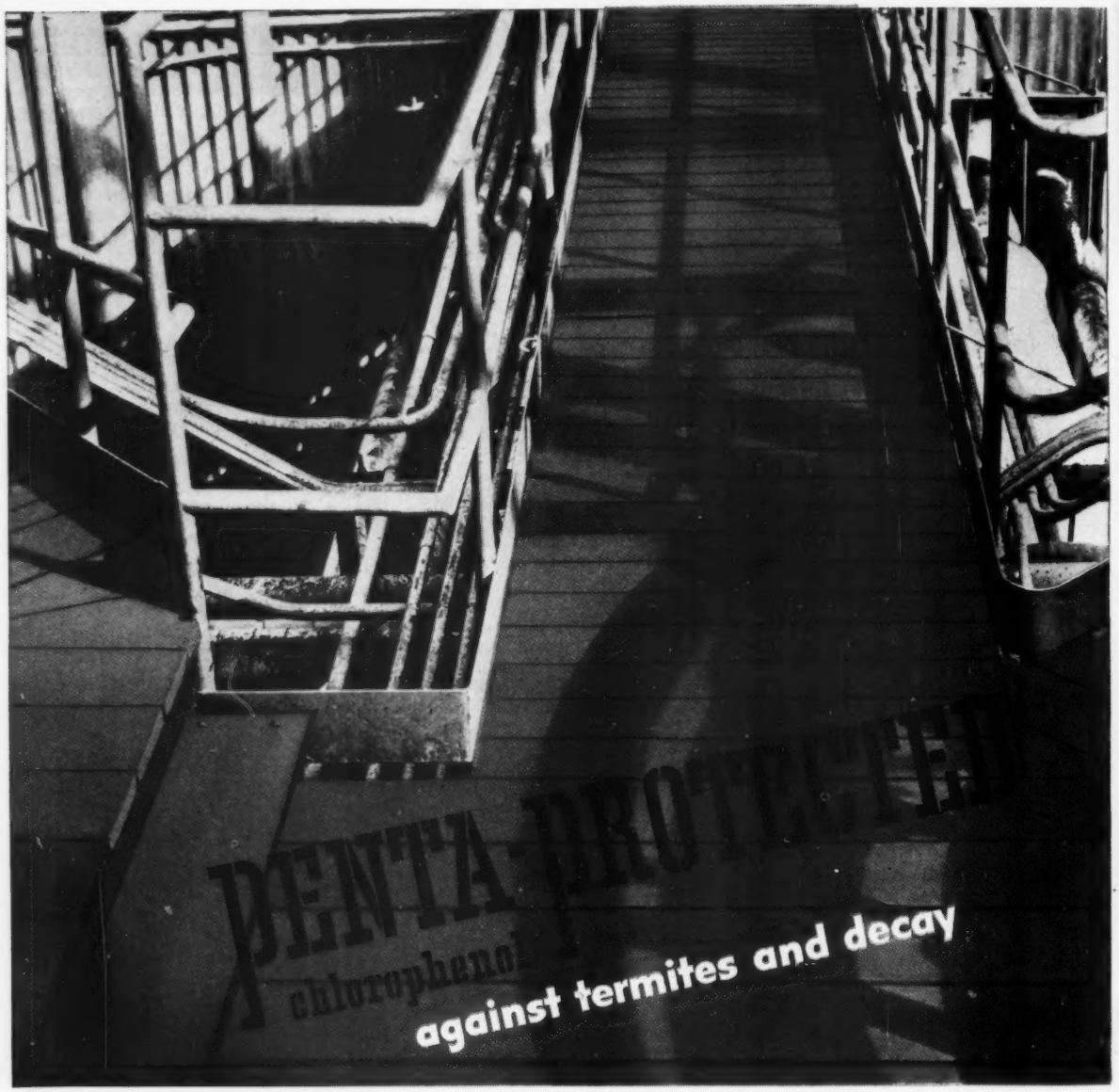

ABSOLUTE VISCOSITY OF GAS SATURATED (BUBBLE POINT) CRUDE OIL AT RESERVOIR TEMPERATURE AND PRESSURE, CENTIPOISES
ABSOLUTE VISCOSITY OF GAS FREE CRUDE AT RESERVOIR TEMPERATURE, CENTIPOISES
GAS IN SOLUTION AT RESERVOIR PRESSURE CUBIC FOOT PER BARREL

Fig. 2 (After Beal, Petroleum Technology, March 1946)





Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma



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Cost-imating

A WEEKLY FEATURE OF THE OIL ANG GAS JOURNAL

Structural Steel Frames

THE quick estimation of the cost of the steel frames used to carry platforms, exchangers, stairs, cranes, etc., resolves itself into an estimation of the weight of steel and the areas or weights of platforms, walkways, stairs, and so on. The cost can then be easily estimated by use of unit costs such as those tabulated in Cost-imating No. 18, February 17, 1949, entitled, "Ladders, Walkways, and Platforms." The end view of a typical frame is indicated on this page. The structure is 9 ft. wide, columns are spaced longitudinally at 10-ft. intervals, and the structure is arranged to carry platforms spaced 8 ft. apart vertically. Platforms, stairs, and walkways can be supplied as desired, and the weights of the structural steel and the platform grating for these can be tabulated separately. Likewise, the horizontal and vertical members can be encased in concrete up to a suitable height (often 30 ft.).

Structural steel.—2,000 lb. per foot of height for a structure length of 100 ft. This does not include the supports for stairs or walkways, nor does it include any grating.

Stair supports.—1,450 lb. for each 8-ft. rise and it includes all weights except that of the stair treads.

Walkway supports.—55 lb. per linear foot for a width of 30 in. and including all weights such as the brackets, longitudinal supports, handrails, and kickplate but not the grating.

Gratings.—Stairs—12 treads each 30 in. long for each 8-ft. rise. Walkways—2½ sq. ft. per linear foot. Platforms—as desired but 40 sq. ft. of area is a common platform.

Concrete-column bases.—Allow 3½ cu. yd. of concrete and 4 yd. of excavation for each footing. The columns are spaced at 10 ft. longitudinally.

Encasing structural steel.—For each foot of height and for a length of 100 ft., the yards of concrete required are approximately:

Horizontal members—66 cu. yd.

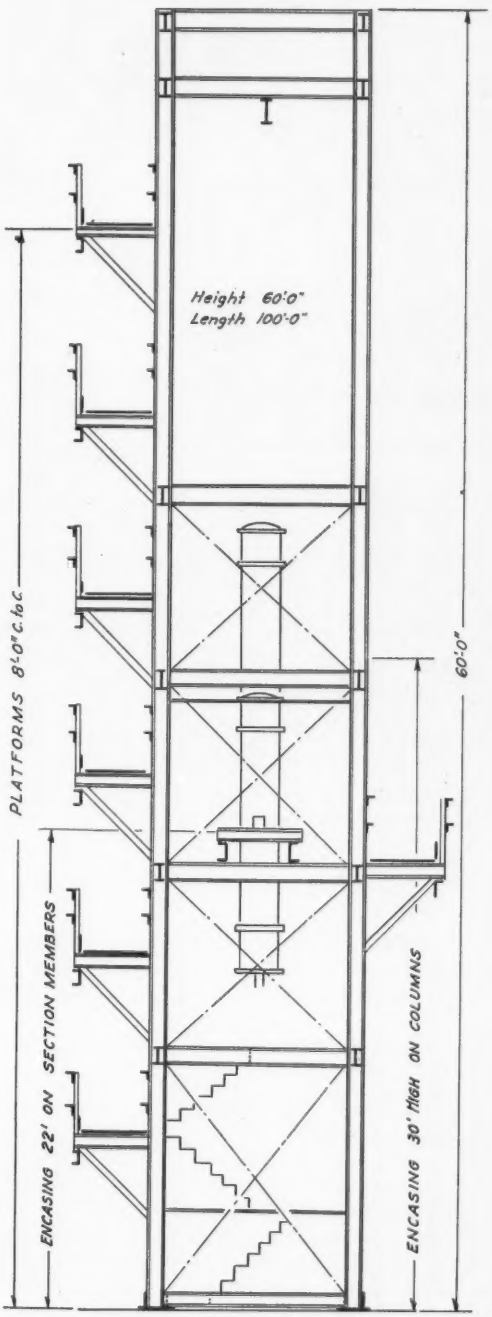
Columns—23 cu. yd.

The encasing structural steel with concrete or other means of fireproofing is very expensive because of the thin sections of concrete and the difficulty of forming—particularly the forming on horizontal or secondary structural members. The 1946 costs are somewhat as follows:

	Unit	Material	Labor
Columns up to 30 ft.	$/cu. yd.	16-18	100-110
Secondary members to 22 ft.	$/cu. yd.	16-18	60-70

Happel, Aries and Borns (Chem. Eng., Dec. 1946, p. 97) state $20 to $30 per cubic yard for material and more than 30 per cent for the labor of encasing beams and columns. Some fireproofing boxings are cheaper than concrete.

A frame that is 18 ft. wide will weigh 50-55 per cent more than the 9-ft. frame discussed here.



No. 28 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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STATEMENT OF CONDITION

April 11, 1949

RESOURCES

Cash and Due from Banks	$49,423,701.97	
U. S. Government Securities	70,621,088.60	
Other Bonds and Warrants	4,282,840.87	$124,327,631.44
Loans and Discounts		32,931,813.96
Overdrafts		2,375.40
Income Receivable Accrued		435,718.01
Prepaid Expenses		73,012.87
Stock in Federal Reserve Bank		180,000.00
Bank Premises		2,000,000.00
Customers' Liability Under Acceptances		25,924.80
TOTAL		$159,976,476.48

LIABILITIES

Deposits		$148,712,068.65
Acceptances Executed		25,924.80
Income Collected, Not Earned		170,909.78
Reserve for Taxes, Interest, etc.		500,856.16
Dividends Declared*		75,000.00
Capital—Common	$3,000,000.00	
Surplus	3,000,000.00	
Undivided Profits and Reserves	4,491,717.09	10,491,717.09
TOTAL		$159,976,476.48

*Payable—$75,000.00 April 15, 1949

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OIL AND GAS EQUIPMENT Digest

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by Dan B. Miller

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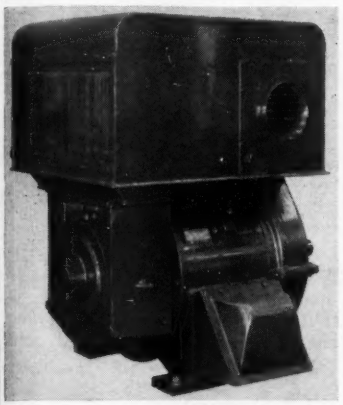
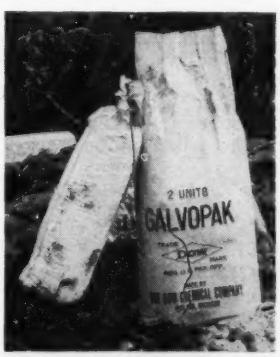


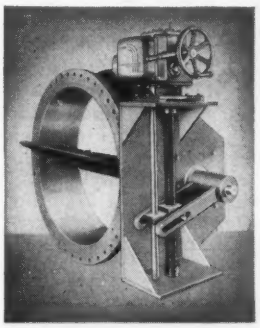
IT'S NEW CHECK IT

(2) MAGNESIUM ANODES. Various types and forms of magnesium anodes are available for cathodic protection, depending upon the application involved and the soil or water conditions encountered. Galvo-Pak is a packaged anode unit, developed to eliminate a number of installation steps and costs. It is packed with a prepared, quick-wetting backfill material in cloth sacks. Galvo-Line is a flexible, cored magnesium ribbon anode, developed for relatively high soil resistivities. It will supply from three to seven times as much current per pound of magnesium installed as the conventional anode. Galvo-Rod is an extruded, cored magnesium anode, originally developed for use in domestic hot-water heaters. It can often be used to bridge the large gap in life expectancy between cast anodes and magnesium ribbon. *Dowell Incorporated.*



IT'S NEW CHECK IT

(3) 54-IN. 50-lb. IRON VALVE for hydraulic service and especially for controlling flow of condenser water. This valve, of rugged construction, has 125-lb. American Standard flanges and is operated by limitorque electric motor connected to threaded reach rod that moves valve very slowly to prevent water hammer. Threads on reach rod can be cut for large variety of speeds ranging from 60 seconds up to 8 minutes. Valve is available in larger sizes, for higher pressures, and in materials other than iron. Illustration shows how wedge-type closure is accomplished by vane or disk. Valve can be fitted with renewable and replaceable rubber spool for positive, 100 per cent shutoff. *R-S Products Corp.*



IT'S NEW CHECK IT

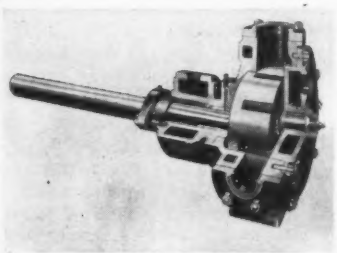
(4) MOBILE GAS-LEAK DETECTOR speedily surveys gas-transmission-pipe lines for leaks. The gas-leak detecting equipment is mounted on a two-wheel chassis. Equipment plows a small furrow in the earth along the

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

course of the pipe line so that wherever a leak exists the gas trapped in the soil is released and detected. A canvas skirt, or flap, attached to the plow blade forms a canopy in which the gas vapors are trapped and withdrawn by means of a constant vacuum into the gas-detecting and measuring instrument. The voltage required for the operation of the gas detector is supplied by the vehicle battery, or any conventional 6-volt battery. Depending on the terrain of the right-of-way, up to 30 miles of pipe line may be surveyed in a day. *Petroleum Instrument Co.*

IT'S NEW CHECK IT



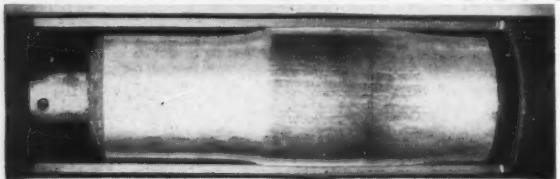
(5) JACKETED PUMPS. Complete individual jackets of generous size for casing, head and rotor bearing sleeve. Suitable for either cooling or heating (up to 125 lb. steam pressure) of the liquid as it passes through the pump. A new jacket on the rotor bearing sleeve enables heating of the packing to retain its pliability and keeps liquid being handled from hardening and solidifying in the packing box. Either right or left-hand port connections available. Made in sizes from 90 to 450 g.p.m. *Viking Pump Co.*

IT'S NEW CHECK IT

(6) CHAIR CHUTES provide added security for personnel who travel in company-owned airplanes. Chair Chutes are recessed into the backs of the airplane chairs and upholtered so that they do not change either the comfort or appearance of the chair. Being "built in," they do not have to be carried about, stored or worn. Can be put on in a matter of seconds while still seated. The harness, which is tucked into sides of the chair, is designed for automatic fit of all persons weighing from 70 to 240 lb. After harness is attached, passenger may arise and the chute will lift out of the chair. Can be installed in all standard airplane seats. *Irving Air Chute Co., Inc.*

IT'S NEW CHECK IT

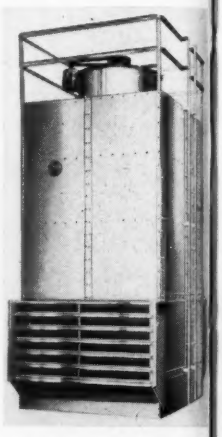
(7) TYPE "B" BRIDGING PLUG. A new, one-piece, ductile aluminum alloy, expansion-type bridging plug



features positive action, greater pipe clearance, and a 90-minute or less drilling-out speed. By eliminating rubber packers the new bridging plug gains greater pipe clearance, allowing it to go in the hole faster. Elimination of rubber, springs, cast iron, steel rings, and slips facilitates drilling out. The ductile aluminum alloy plug expands when the power charge is fired, and forces itself against the pipe, tight enough to hold extremely high pressures and also tight enough to hold itself against rotation until it is drilled out. *McCullough Tool Co.*

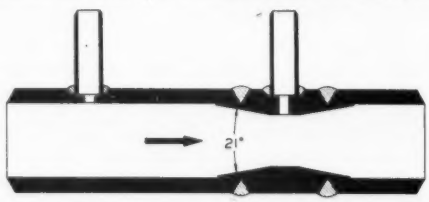
IT'S NEW CHECK IT

(8) VERFLOW, a medium to large-capacity cooling tower is easy to erect and requires little maintenance time. Designed in wood or steel its outstanding features are: lifetime nailless filling, easy to remove and reinstall; balanced spray system with low-pressure nozzles; access port to inspect and clean nozzles; totally enclosed motor; enclosed bearing housing with grease-packed bearings; air-foil section cast aluminum alloy fans, multiple-celled units if desired; special corrosion-resistant paint on metal towers; heavy double-sheathed wood casing on wood towers; hinged louver frames and removable louvers; and complete basin fixtures. *Marley Co., Inc.*



IT'S NEW CHECK IT

(9) SMALL-SIZE VENTURI TUBES for line sizes between ¾ and 3 in. are supplied with welding ends, with stub end welding nipples for measurement connections. They



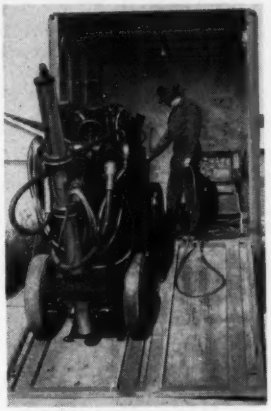
can be furnished in steel, stainless steel, monel, brass, bronze, or any other metal which can be obtained in tubular and bar forms, and which can be readily welded or brazed. These tubes are particularly useful where line fluid velocities are so high that excessive differential range is required with an orifice plate, or where solids in suspension in the line fluid tend to deposit in the space immediately ahead of, or after an orifice, or on the orifice plate itself. *Republic Flow Meters Co.*

IT'S NEW CHECK IT

(10) HEAVY-DUTY TRAVELING BLOCKS. The double-row sealed American Roller bearings are specially engineered for these blocks. Under any angle of pull, the integral thrust shoulders keep the sheave running smooth and without wobble. Alignment is automatically assured by the design of the bearing. On the larger blocks, which handle big loads, the bearings are of unusually large diameter. All bearings are lubricated through conveniently placed pressure grease fittings. Grease goes direct to inner race of each bearing. *Wheland Co.*

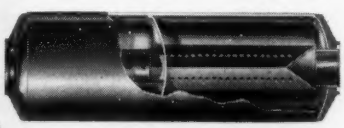
IT'S NEW CHECK IT

(11) INDUSTRIAL X-RAY INSPECTION. Mounted on rubber tires, the X-ray unit designed for locating defects in metal installations, travels from one assignment to another in this van which also houses complete dark room facilities. Any inspection can be completed in from 20 to 30 minutes. Power for unit is self contained. Internal defects, in welds such as porosity, slag inclusions, improper fusion, or cracks can easily be found. In castings, common faults that X-ray will detect are blowholes, porosity, shrinkage, and cracks. *Arthur C. Sweeny, Jr.*



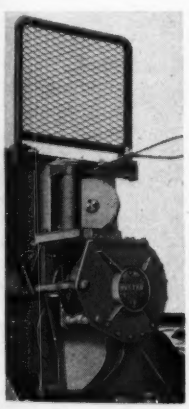
IT'S NEW CHECK IT

(12) SLUG BUSTER SNUBBER is designed to reduce noise from engine exhausts and vacuum-pump discharges to the noise level of the surrounding industrial area. This snubber is a heavy-duty unit, sturdily constructed and portable. A heavy, double shell, internal reinforcements, and flanged, dome-type heads provide added support and strength. Heavy gussets at each end of the snubber help maintain proper alignment. These units, available in pipe sizes from 5 to 24 in., have multiple snubbing chambers for improved performance. *Burgess-Manning Co.*



IT'S NEW CHECK IT

(13) HYSPEED WINCH is a new single drum winch for use with Caterpillar D6, D7, and DW10 diesel tractors. Planetary gearing in the unit is designed in such a manner that when clutch and brake are released, the drum tends to free spool the cable. Standard controls on all four tractors are a two-lever hydraulic system. Optional single lever mechanical controls synchronizing clutch and brake action are available for all except the DW10. All gearing is enclosed and runs in oil. The base unit for all four tractors is the same, requiring only different adapters for mounting on the different-sized tractors. *Hyster Co.*



IT'S NEW CHECK IT

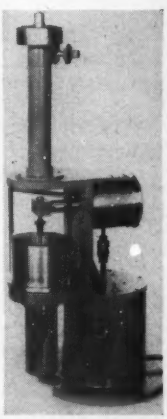
(14) TRUCK METERS FLANGES. All three of this company's truck meters will be furnished with forged steel inlet flanges instead of cast iron flanges. Installations may now be made with tubing welded directly to flanges or with screwed pipe at users' option. Welded tubing allows higher speed deliveries due to larger interior bores, smoother bends, less friction. *Smith Meter Co.*

IT'S NEW CHECK IT

(15) COMPACT CENTRAL-STATION UNIT for use in FM radiophone communications systems in the 30 to 44-megacycle and 152 to 162-megacycle bands has all essential equipment with the exception of microphone and antenna system housed in a cabinet, suitable for desk or wall mounting, 38 in. high, 25 in. wide, and 11¼ in. deep. The equipment chassis are mounted on a standard-size telephone relay rack which is hinged at the bottom to permit tilting the equipment forward for easy access to the rear of the chassis. The receivers employed in all models of the compact central station make use of a unique F.M. detector which will not respond to A.M. noise pulses and increases selectivity by rejection of off-frequency signals, which will not allow the detector to lock in. *Industrial Division Philco Corp.*

IT'S NEW CHECK IT

(16) TEXACO VISCOSIMETER makes possible the study of plastic fluids and thixotropic suspensions. Instrument accommodates either the specially designed laminar cup and rotor, or a standard "Stormer" cup and rotor, to make possible comparative Stormer readings. Sample cup and water bath rest on the torsion table. Torsion table hangs suspended by a heat-treated beryllium copper torsion wire. By rotating the torsion head, the table may be returned to zero deflection. Since instrument is calibrated with true viscous fluids, deflections may be converted directly to centipoise. By proper selection of the correct size torsion wires, an extremely wide range of viscosities may be determined accurately. *Southwestern Industrial Electronic Co.*



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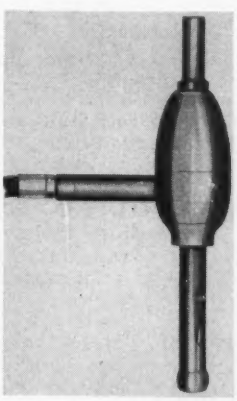

(17) CONDENSER TUBE CUTTER, INTERNAL TYPE, is designed for use with condenser tubes ranging in size from ½ to 1½ in. in diameter. For use with either air or electric-driven motors, the cutter may be operated at speeds of 250 to 750 r.p.m. Recommended for use in cutting both ferrous and nonferrous tubes and for the removal of bimetal tubes, the new tool cuts cleanly and at high speed through tube sheets thicknesses from ½ to 6 in. Spacing collars are furnished for various tube-sheet thicknesses. *Airetool Manufacturing Co.*

IT'S NEW CHECK IT

(18) MICROSEN THERMAL SWITCH operates from a thermocouple input to accurately signal temperature variations in heating processes. The signal output is given by electrical relay action. On-and-off switching of 10 amp. at 115 volts a.c. or 32 volts d.c. directly is possible for any temperature setting from 100° to 2,000° F. Larger electrical

loads such as large ovens or other heating devices can be switched by means of intermediate relays. The thermal switch is also applicable to on-and-off control of electrically operated valves, warning signals, or motors. Standard ranges are: 100°-600° F., 100°-1,000° F., 400°-1,600° F., and 800°-2,000° F. The fixed differential is less than 2 per cent of the calibrated range. Temperature setting within any of the above ranges are made by means of a simple knob and pointer on the chassis. *Manning, Maxwell & Moore, Inc.*

IT'S NEW ✓ CHECK IT

TRADE LITERATURE

(19) BULLETIN PB 7000-1 describes these new two-pole, 250-3,500 hp., fabri-steel induction motors. Illustrations and concise wording explain details of construction. *Elliott Co.*

(20) PIPE MARKERS. A four-page bulletin describes self-adhesive Quik-Label pipe markers for pipe identification systems. *W. H. Brady Co.*

(21) FIN-FAN EXCHANGER. Publication describes and illustrates the design of this unit, in which the condensing or cooling elements are helically finned K-Fin sections. Typical installations are also shown. *Griscom-Russell Co.*

(22) FLEXIBLE METAL HOSE AND EXPANSION JOINTS. This 68-page colorfully prepared book contains full description and complete specifications for standard types of flexible metal hose, expansion joints for piping systems, and stainless steel and brass bellows. *Chicago Metal Hose Corp.*

(23) ANNIVERSARY CATALOG. featuring pressure and temperature regulators, float valves, self-cleaning strainers and steam traps, it includes dimensions, application, capacity, engineering tables, and specifications. *O. C. Keckley Co.*

(24) RELIEF VALVE contains the latest information on forged steel relief valves. Included in this bulletin is complete information on dimensions and weights, design detail, and correct installation. *Edward Valves, Inc.*

(25) RESISTANCE OF HIGH NICKEL ALLOYS TO SULFURIC ACID CORROSION. A new 44-page technical bulletin discusses problems involving a wide range of operations from the pickling of steel to petroleum refining. *International Nickel Co., Inc.*

(26) INDUSTRIAL WASTE DISPOSAL. Bulletin describes the application of the company's automatic pH recording and controlling instruments and recording flowmeters to industrial waste disposal operations. *The Bristol Co.*

IT'S NEW ✓ CHECK IT

(27) SLUSH PUMP LINERS is a new 12-page illustrated catalog listing liners for every principal make of slush pump. Improved techniques in the manufacture of liners designed for longer life under greater pressures and highly-abrasive muds is explained. *Falcon Products, Inc.*

(28) HAYS-COCHRANE FLOW METERS includes eight pages of photographs showing the various steps in making of Hays-Cochrane electric and mechanical flow meters. *Penn Industrial Instrument Corp.*

(29) WELL-LOG DUPLICATION IN COLOR. This illustrated folder describes the advantages and process by which your well logs can be duplicated in color. *Color Research, Inc.*

(30) EVERETT TRENCHER, a four-page, well-illustrated brochure gives complete specifications and job applications on this trencher suitable for installation on Ferguson, Ford-Ferguson and Ford tractors. *Everett Manufacturing Co., Inc.*

(31) MODERN THREADS AMONG THE OLD. An eight-page folder illustrates and gives complete details on pipe tools manufactured by the company. *V-Mac Industries, Inc.*

(32) TURBO PUMPS, HIGH-SPEED, SINGLE STAGE. The folder includes detailed diagrammatic illustrations, together with complete information on capacities of these pumps rated at from 200 to 500 g.p.m. *J. S. Coffin, Jr., Co.*

(33) PNEUMATIC CONTROLS FOR OIL RIGS, an eight-page brochure graphically illustrates a control for each pneumatic operation on modern rigs. *Westinghouse Air Brake Co.*

(34) CHEMICAL PROCESS INDUSTRIES explains the equipment and service offered by this firm of builders and designers of process plants. *Vulcan Copper & Supply Co.*

(35) MOGUL TORCAIR. This temporary folder describes the single-drum drilling rig, gives complete specifications, and includes elevation and plan diagrams of the unit. *Wilson Manufacturing Co.*

(36) OIL-FIELD EQUIPMENT. This book illustrates and describes operation of power tubing tongs, compressor model 3100, and power sucker-rod wrenches. *Hillman-Kelly, Inc.*

(37) STEEL BOILERS. Cross-sectional illustrations, complete data and measurements, line diagrams, and applications of each unit are fully explained in this 22-page catalog. *Kewanee Boiler Corp.*

(38) STAINLESS STEEL. Detailed, specific information as to the products available or the properties of Alloy 20 together with the line of pipe fittings recently added to the line are all included in this folder. *Electric Steel Foundry Co.*

IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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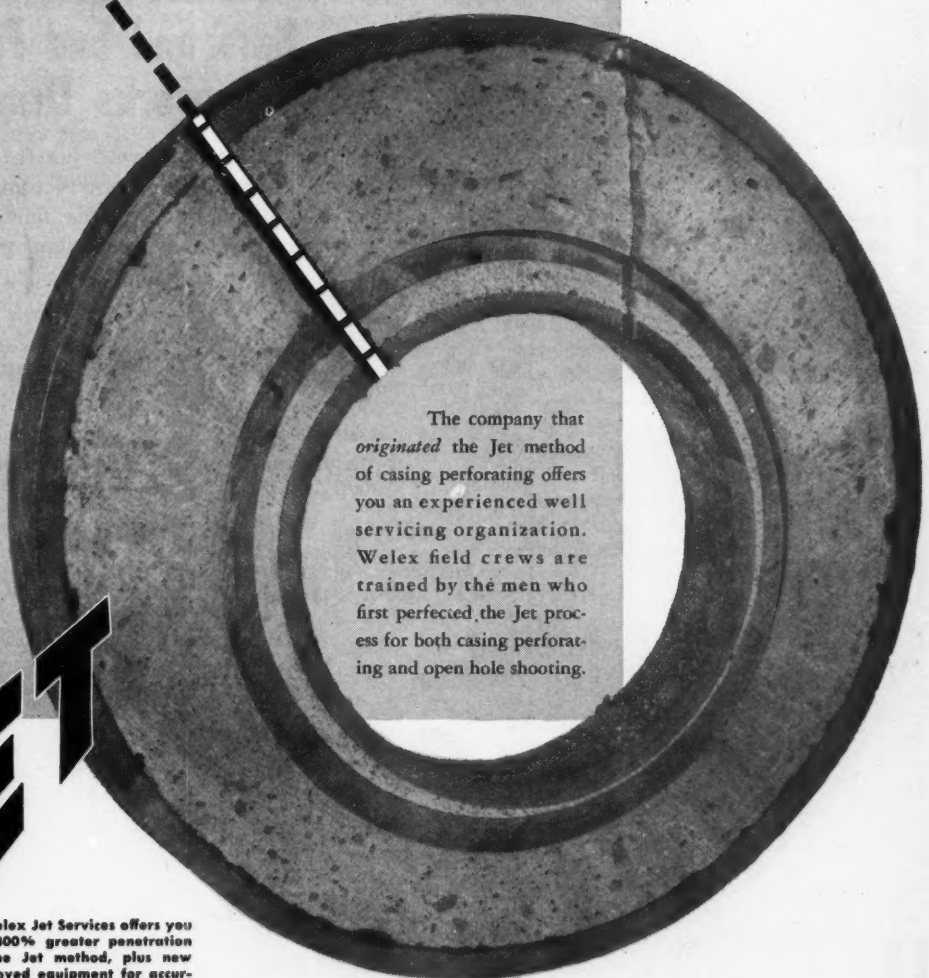
How to Perforate Casing *for* DEEPER PENETRATION *and* INCREASED OIL FLOW



The company that *originated* the Jet method of casing perforating offers you an experienced well servicing organization. Welex field crews are trained by the men who first perfected the Jet process for both casing perforating and open hole shooting.

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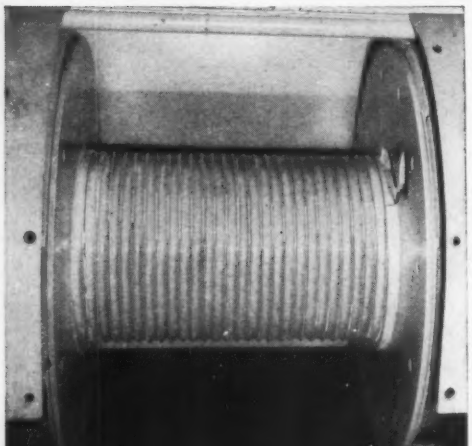


- ON WIRE ROPE
- CUT-OFF TIME
- ELIMINATE SPOOLING TROUBLE

with LeBus Wire Line Groove Bars and End Fillers on Your Drawworks Drum

Above is shown a drawworks drum equipped with LeBus Wire Line Groove Bar. This installation can be made quickly and easily either in the field or shop.

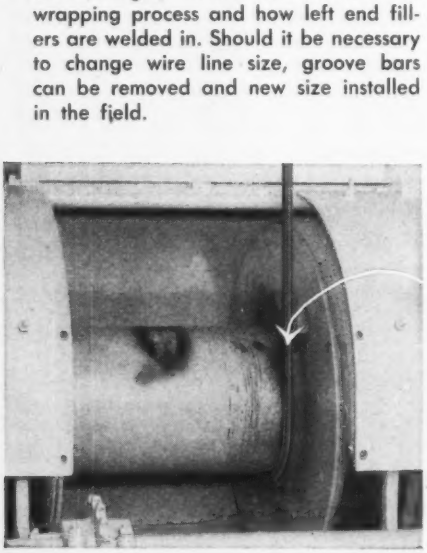
Photograph below shows how end fillers are installed and the first section of groove bar started. Size bar available for every drilling line size.

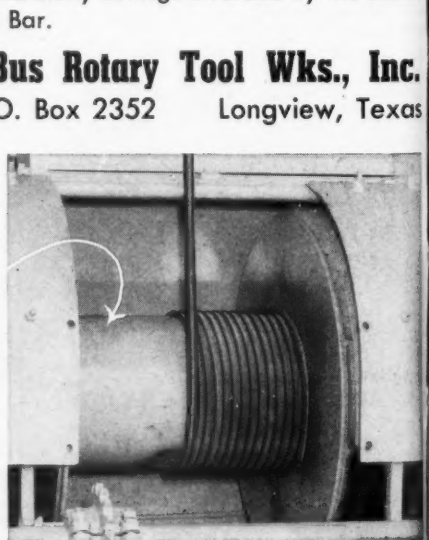
Below, right, shows continuation of wrapping process and how left end fillers are welded in. Should it be necessary to change wire line size, groove bars can be removed and new size installed in the field.

Notice the drum grooves. They're installed in the field to fit whatever size line you're using. Can be changed to fit new size line with little time and trouble. Prevents crushing first and succeeding wraps—thus makes line safer and longer lasting. When cutting line end to change wear points, line is wrapped on properly, promptly—saving time and trouble.

Write today for complete details on equipping your rig drums. State make and model rig and size line you're using. You'll be surprised and pleased with the low price, easy installation and many savings afforded by the LeBus Wire Line Groove Bar.

LeBus Rotary Tool Wks., Inc.
P. O. Box 2352 Longview, Texas





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C & W Machine Works
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M-C-M Machine Works
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Oklahoma City 9, Okl

Hunt Export Company
Room 2503, 19 Rector Street
New York City, N. Y.

S. R. Bowen Co., Santa Fe Springs, Calif., and Casper, Wyo.

Among the

Drilling Contractors

Three Wells Contracted For New Texas Oil Field

Contracts have been awarded for three offsets to the discovery well of the new shallow sand oil pool recently opened by George W. Strake 4 miles northwest of Winters, Runnels County, west central Texas.

C-B Drilling Co., Abiline, Tex., which drilled the discovery well, has the contract for the east offset. The rig on the discovery well is being moved to the new location.

Cactus Drilling Co. of San Angelo, Tex., will drill the northeast offset, and Sam Crump, also of San Angelo, a north offset. Both are now moving in rigs from other areas.

The discovery well was completed in the Gunsight sand of the Cisco section (Pennsylvanian) at a depth of 2,811-25 ft. It has a potential of 436 bbl. of 39° oil per day.

California Contractors to Study "Cost Factors"

A symposium on "Cost Factors in Drilling" will constitute the third of a series of management institutes being sponsored by the California chapter of the American Association of Oilwell Drilling Contractors in conjunction with the University of Southern California Department of Education. The session will be held May 2 and 3 in the State Building, Los Angeles, with W. K. Towell, consultant of Dallas, as director.

The institutes are being conducted to keep members of the association informed on the most modern concepts of administrative functioning. The first of the series, held April 11, was devoted to the subject of "Functions of Management" and was led by Brasil Kantzer and H. E. Winter of the Union Oil Co. The second, held April 25, dealt with "Labor-Management Relations," and was directed by John Forline.

Other subjects to be taken up at future institutes and their scheduled dates are: "Management Responsibility on Accident Prevention," May 16; "Legal Position of the Drilling Contractor," and "Insurance Position of the Drilling Contractor," June 6; "Public Relations and the Drilling Contractor," June 20.

Four Way Drilling Moves

Four Way Drilling Co., Daytona Beach, Fla., has opened temporary offices in Evansville, Ind., to engage in drilling operations in the tri-state area of Illinois, Indiana and Kentucky. R. E. "Bob" Thorpe has moved from the Florida city to be in charge.

Smith Joins V-T Drilling

H. C. Smith, formerly superintendent for Globe Oil & Refining Co. at Pauls Valley, Okla., is the new production superintendent for V-T Drilling Co., Evansville, Ind. He will be located at Mount Carmel, Ill.

Lined up at the side of their rig, the toolpusher and day tour crew on a well being drilled by K. L. Kellogg & Sons, Los Angeles, for Hancock Oil Co. in the Signal Hill field consent to pose for The Oil and Gas Journal's staff photographer. Left to right: J. F. Tinsley (toolpusher), M. Torpey (driller), M. Bennet, L. A. Smith, V. Ashcroft and R. Keith

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WATER GAGE SET

For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

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'BESTOLIFE—the Lead Seal Joint Compound used successfully in the Drilling and Refining Industries for years — is immediately available through more than 100 distributors in the U.S.A.

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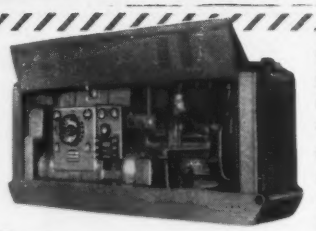

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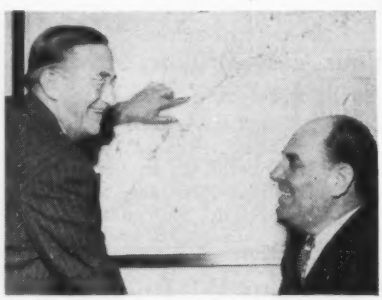
Wright Drilling Co.
Houston, Tex.

ONE of the more active drilling contracting firms on the Gulf Coast, Wright Drilling Co. had its inception in 1939. It was founded by Roxie Wright, who continues as one of its principal owners. Since reorganization of the company early this year, Frank Champion, Houston independent operator, has been associated with Wright in the management. Offices of the company are located in the Neils Esperson Building. Also headquartered there are Champion Oil & Gas Co. and Champion & Smith, Inc., recently formed exporting firm.



Roxie Wright (left) and Frank Champion

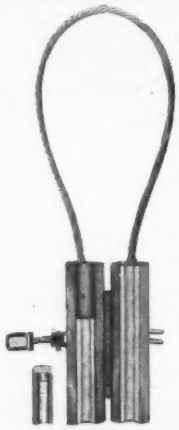
Officers and personnel.—Champion is president and general manager. Wright is vice president and superintendent of field operations. G. E. "Babe" Cannon is assistant superintendent, and William Jordon, toolpusher.

Equipment.—The company currently is operating five steam-powered rigs. All at present are located in the upper Gulf Coast area.

Industry experience.—Wright has been actively engaged in the oil industry since 1914. He began his oil career with the Rio Bravo Oil Co. as a roustabout, roughneck and driller. He took part in the Burkburnett boom and has worked in many fields throughout Texas, Oklahoma and Arkansas. Champion also has had long service, both in the oil operating and equipment manufacturing industries. Prior to becoming an independent operator, he was associated with the McCarthy interests as vice president, and previous to that he was vice president and general manager of the oil-tool division of Byron Jackson Co.

Spare that line!

Approximately 6000 feet of line can be spooled TIGHT on the drum with assured safety, before you need to change the removable bronze liners of the S-I-W Line Tightener.



SPOOL TIGHT WITH AN S-I-W LINE TIGHTENER

An adjustable hasp permits quick opening and closing of the S-I-W Line Tightener. A cable loop permits easy swinging from the derrick. Closed, the S-I-W Line Tightener grips running line firmly for even drum spooling. Steel liners can be supplied at no extra cost.

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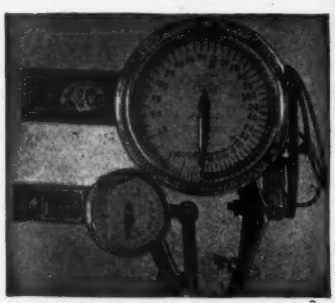
LINE SCALES



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With a LINE SCALE you know the pull on the line, and the weight on the bit in pounds. Repeated tests prove the accuracy and dependability of LINE SCALE readings under all working conditions . . . even in areas of rapid temperature changes.

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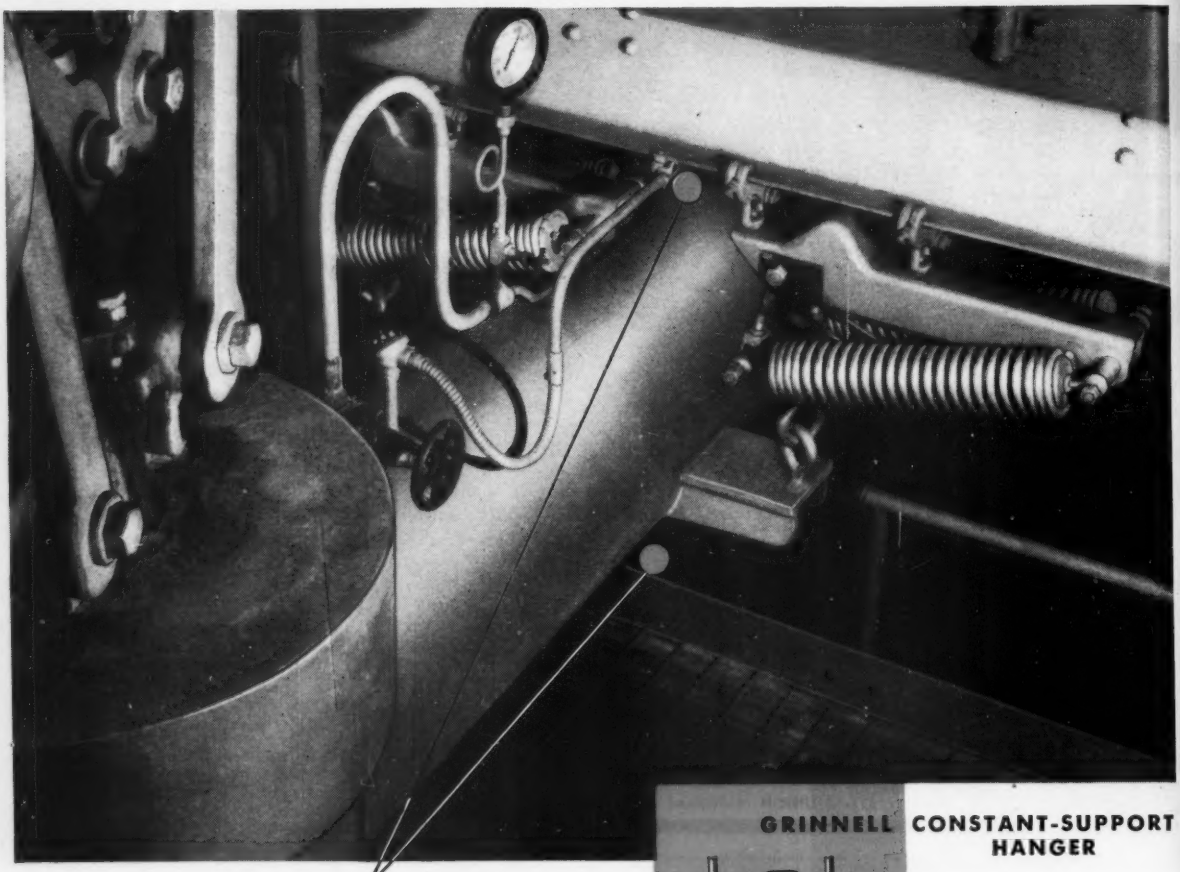

PLAYROOM for a HEAVYWEIGHT

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At every point of its travel, the weight of this piping is fully supported by Grinnell Constant-Support Hangers. Yet, because of their compact design, little extra "playroom" need be allowed in which to install the hangers.

Write for the new Grinnell Pipe Hanger Catalog 10-D, containing every pipe hanger, part and accessory, with full instructions for easy selection and correct specification.

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- provides constant support to piping subject to vertical movement—in all "hot" and "cold" positions.
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- mass-produced from standard precision parts.
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REFINING

Jersey Affiliates Set New Refining Records

REFINERIES of affiliated companies of Standard Oil Co. (N. J.) set records during 1948 in meeting the high demand for gasoline, home-heating oil, and other petroleum products, the parent company reported last week.

In reviewing figures on refinery operations for inclusion in its annual report, Jersey Standard stated that during 1948 its affiliated companies processed an average of 1,390,000 bbl. of crude oil daily, both domestic plants and plants outside the United States, increasing their throughput more than 6 per cent over 1947.

Crude-oil runs of affiliated companies in the United States, the company reported, represented about 13 per cent of the total for the domestic industry, and those of foreign affiliates about 19 per cent of the industry total outside the country.

In reporting on expansion and modernization programs of its affiliates, Jersey Standard said that Esso Standard Oil Co., while raising product output to a new high level, had made important additions to its refineries with further units in its construction plan to be completed this year.

Construction of Carter Oil Co.'s new refinery at Billings, Mont., was about 60 per cent finished by the end of 1948, and expansion program of Imperial Oil, Ltd., under way at the Montreal refinery since 1946, was completed. The first phase of Imperial's new refinery project at Edmonton was completed within 12 months. The refinery, transported piece by piece from Whitehorse, 1,350 miles distant, is now serving the Leduc field.

At Aruba, Netherlands West Indies, crude runs were decreased toward end of the year due to reduced demand for heavy fuel oil. Creole Petroleum Corp. was expected to complete construction of a 60,000-bbl.-per-day refinery at Amuay, Venezuela, late this year.

Seven Injured in Blast at Skelly Refinery at Eunice

Seven persons were injured April 22, two of them critically, in an explosion at Skelly Oil Co.'s new refinery at Eunice, N. M.

Plant Superintendent C. C. Coffee said a leak in a natural-gas line probably caused the blast, which occurred at 10:55 a.m. as the line was being connected in the engine room. Gas presumably was touched off by a spark from equipment there, Coffey said.

The injured were taken to Eunice hospitals, and all available blood plasma was brought to the city from Hobbs, 18 miles north, by Deputy Sheriff Charles Trimble. Another 25-case shipment of plasma was being flown in from Dallas.

Refinery at Oil City, Pa. Shuts Down for 30 Days

Due to falling off in demand for Pennsylvania Grade crude oil, the Independent Refining plant at Oil City, Pa., halted production last week, for a period of 1 month. Only one-third of the plant's approximately 90 hourly employes will be retained during the shutdown, Guy Hunter, Emlenton, Pa., vice president in charge of manufacturing for Quaker State Oil Refining Corp., reported.

The skeleton force, which will be picked from the plant's oldest employes, in point of service, will be used to do maintenance work at the Seneca Street plant, and also to ship out oil stocks on hand.

The shutdown marks Independent's first prolonged inactivity in a number of years, and according to Hunter will give the plant an opportunity to make some necessary repairs.

Kettering Addresses Esso Research Club's Meeting

Formal ceremonies were held at Esso Research Center, Linden, N. J., April 20 to mark the installation of the Esso Research Club as the first industrial affiliate of the Scientific Research Society of America. Featured speaker of the evening was Charles F. Kettering, director and retired vice president of General Motors Corp.

The Esso Research Club, with a membership of 240, was founded in 1942 as a social and scientific organization of technical employes of Standard Oil Co. (N.J.) most of whom are engaged in research in petroleum refining and petrochemistry.

The Scientific Research Society of America, popularly known as RESA, was organized in 1947 by Sigma Xi, honorary scientific society with chapters in many colleges and universities

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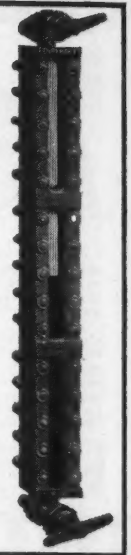

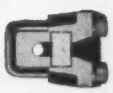

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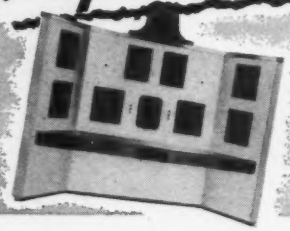

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DEPENDABLE

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Standard of the Oil Fields

McCORD

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in the United States and Canada. The new society parallels for industrial and governmental research workers, the functions of Sigma Xi in the academic world. Walter R. F. Guyer, outgoing president of Esso Research Club was presented the first membership charter in RESA by Dr. Donald B. Prentice, director of RESA and past president of Rose Polytechnic Institute.

Kettering, in addressing the club stressed the power of imagination in research work, stating that vastly improved uses of power are developing through cooperative research organizations of the petroleum and automotive industries. He voiced the opinion that improvements were only beginning in the realm of high-compression motors, pointing out that mechanical efficiency of new motors was being improved to cope with the generally enhanced combustion efficiency afforded through higher compression.

Sunray's Duncan Refinery Workers Reject Unions

Employes at Sunray Oil Corp.'s refinery at Duncan, Okla., have rejected affiliation with either the C.I.O. or A.F. of L. unions in a National Labor Relations Board election, results of which were announced last week.

Of the 231 eligible employes who voted, 122 cast their ballots "for the company," indicating they did not want union representation. Eighty-three cast votes for C.I.O. and 17 voted for A.F. of L. union. Nine votes were challenged as to eligibility and were not counted.

Sunray announced last week that the National Labor Relations Board has dismissed in its entirety an unfair-labor practices charge against the firm. The charge was filed at Duncan by the Oil Workers International Union, C.I.O., in 1948. Announcement of the decision affirming the recommendation of Trial Examiner Horace A. Ruckel for dismissal was signed by a three-member panel.

In the original charge Sunray was accused of unfair labor practices in connection with the discharge of an employe.

Use of Diesel Fuel Oil to Double, Reinhart Predicts

Diesel fuel-oil consumption in 1951 probably will double the 1948 total of 30,000,000 bbl., R. W. Reinhart, manager of Socony-Vacuum Oil Co., Inc.'s, market-research department, told members of the New York Railroad Club last week. At the same time, use of lubricants in diesel locomotives is expected to rise from 330,000 bbl. in 1948 to 630,000 bbl. in 1951, he added.

Reinhart said that this prediction is at the rate of a 36 per cent increase in 1949 over 1948; 27 per cent increase in 1950 over 1949, and 21 per cent increase in 1951 over the preceding year.

"The continuing changeover of American railroads to diesel engines has been along two lines," Reinhart said. "In one case the diesel engines are replacing engines which burn coal, and in the other, diesels are being substituted for engines which require heavy fuel oils for power.

"A barrel of diesel fuel is 10 times more efficient than residual fuel oil in a switching locomotive, and five times more efficient in a freight locomotive. In passenger locomotives, a barrel of diesel fuel is equivalent to almost four barrels of residual fuel oil."

Use of petroleum in the United States, he concluded, is now about 85 per cent above the 1938 level, an increase of 2,300,000 bbl. per day to 5,900,000. It took other countries in the world more than 80 years to develop crude-oil production which is equal to the United States increase in just these 10 years, he said.

Students Visit Refinery

HOUSTON.—More than 70 students from Texas A. & M. College, Texas Technological College, and Centenary College, made a tour last week of the refinery and chemical facilities of Shell Oil Co., Inc.

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Simple in design, ruggedly built for heavy duty service. Gear ratio and throw of crank produce required speed with no strain. Heads and cranks of 100 CC and 15 CC machines are interchangeable. Meets *A.S.T.M. Standard Method D-98 and A.P.I. Code No. 25 requirements.* Ask for full details.

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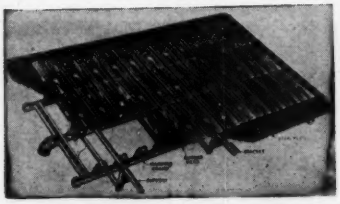

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These burners derive their higher efficiency and longer life from such features as: All-steel construction; Burner heads with double barrel shank and double mixer are equivalent to two ordinary burner heads; Slight H-shape of head assures more perfect combustion by proper circulation of secondary air; series of heads on triple manifold covers approximately entire firebox area. For superior efficiency, specify Volcano Superior Gas Burners.

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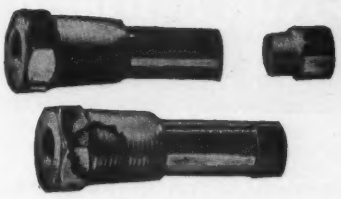

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Unique design permits replacement of inserts instead of the entire plug. OSECO "Silver Top" plugs are made in all standard sizes of best quality bronze, under A.S.M.E. specifications, for 300 and 350 lb. oil field boilers. They can also be furnished in Monel or Stainless Steel.

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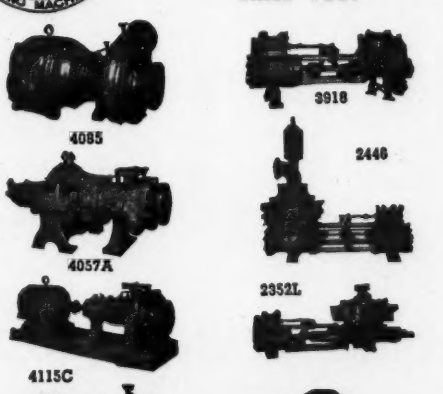

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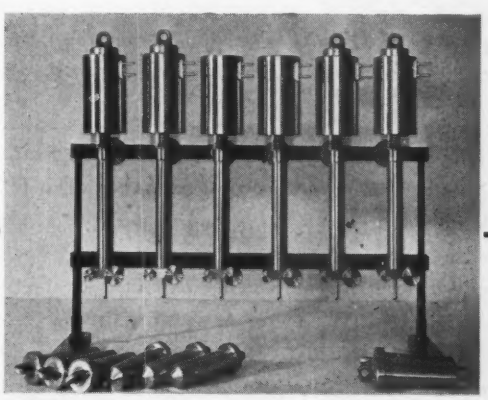

FLUID CONTENT STILLS

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Ruska Instrument Corporation specializes in the development and manufacture of scientific instruments for the oil and mining industries.

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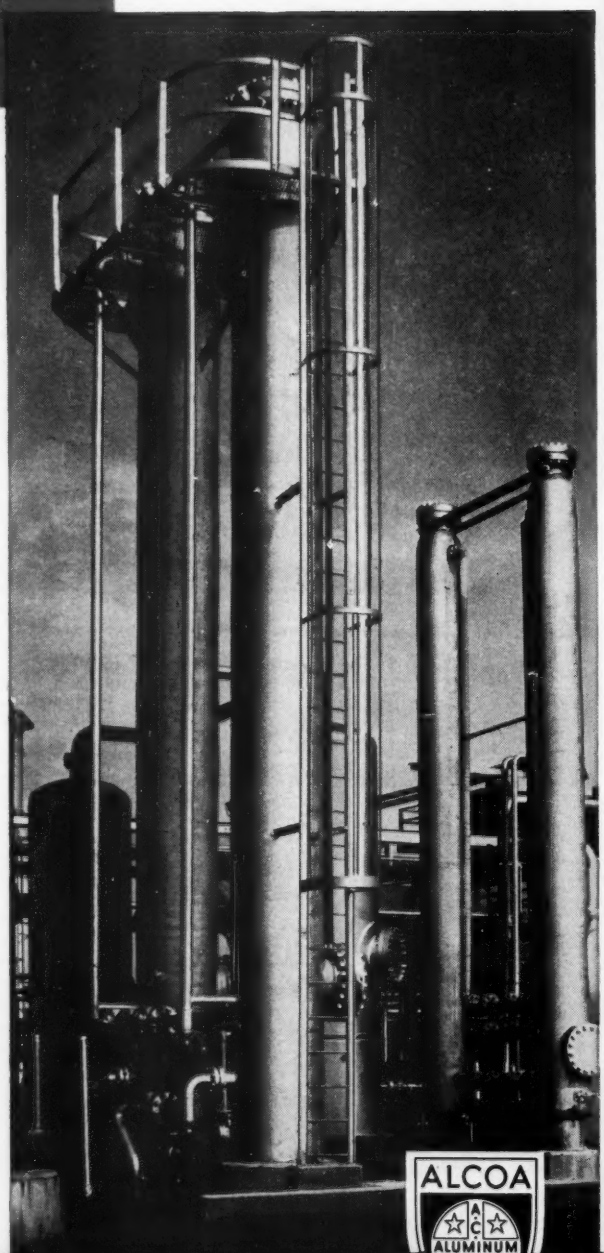
WARREN PETROLEUM CORPORATION DRIES BOTH LIQUID AND GAS WITH ALCOA ACTIVATED ALUMINA

Because ALCOA Activated Alumina is economical for dehydrating both liquids and gases, Warren Petroleum Corporation uses it to dry liquid propane and residue gas to *minus* 40° F. dew point, at their Holliday, Texas, plant.

The larger pair of towers in the photograph are the residue gas dehydrators through which approximately 13 million standard cubic feet of gas is passed per day at a working pressure of 800 psig. Gas enters the towers at 80° F. to 90° F. Regeneration is accomplished in 4 hours with natural gas heated to 380° F., after which the tower is cooled before being put on stream.

The smaller pair of towers dehydrate 35,000 gallons of liquid propane per day at a working pressure of 215 psig. The liquid enters the towers at 80° F. to 90° F. Natural gas, heated to 380° F., is used for regeneration.

This is a typical example of ALCOA Activated Alumina "at work"—a desiccant that dries *both* liquids and gases quickly and efficiently. It also adsorbs certain gases and vapors from gaseous mixtures. Let us tell you more about this versatile drying agent. Write to: ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 1967 Gulf Building, Pittsburgh 19, Pennsylvania.



Dehydrating units at Warren Petroleum Corporation, Holliday, Texas. Towers at left dry residue gas. Those at right dry liquid propane. All four towers charged with Alcoa Activated Alumina.

ALCOA CHEMICALS

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NATURAL GAS

Work Is Under Way on New Dehydration Plant

CONSTRUCTION is well under way and most equipment has been delivered at the site of the new gas-compression and dehydration plant being built by Humble Oil & Refining Co., and Gulf Oil Corp., in the Thompsons area south of Richmond, Tex. Completion is scheduled around June 1.

The two firms each have a 50 per cent working interest in the plant, with construction and operation under supervision of Humble.

Equipment to be installed includes two 1,100-hp. compressors, and one 880-hp. compressor. The plant will have a design capacity of approximately 17,000,000 cu. ft. of gas per day (16.7-lb. pressure base) sufficient to gather and compress all casing-head gas produced in the Thompsons, South Thompsons, and North Thompsons fields.

United Gas Corp. has agreed to purchase all of Humble's and Gulf's compressed casing-head gas production delivered at 500 psi. in the field. If desired by other operators in the area, their casing-head gas will be gathered, compressed, and returned to them for their disposition at only the cost of such operations.

Since the gas is practically dry as produced from the wells, and is suitable for direct marketing, no liquid products will be recovered.

The compression plant will be operated by five employes, and five additional houses will be added to Humble's Thompsons production camp for crewmen and their families.

Two Favorable Gas Bills Passed in West Virginia

Two bills favorably affecting the oil and gas industry have been passed by the West Virginia Legislature.

Senate Bill 73 (in effect from passage) provides for condemnation by public-utility gas companies, selling natural gas at retail, to obtain underground areas in subterranean strata which, "as shown by previous exploration of the stratum sought to be condemned . . . has ceased to produce or has been proven nonproductive of oil and/or gas in substantial quantities."

Senate Bill 136 (in effect June 10, 1949), removes the inhibition against granting permits by the State Road Commissioner giving to any person, firm, or corporation, the right to operate or maintain any main gas line or lines with a diameter exceeding 4 in. in any right-of-way of a public road.

Workmen laying foundation for new gas compression and dehydration plant being constructed in the Thompsons (Texas) area about 20 miles south of Richmond by Humble Oil & Refining Co., and Gulf Oil Corp. Plant will have capacity great enough to compress all casing-head gas produced in Thompsons, South Thompsons, and North Thompsons fields

A.G.A. Production, Chemical Conference Meets May 23

New developments in the production and chemical fields of the gas industry will be presented at the joint production and chemical conference of Technical Section, American Gas Association, at Hotel New Yorker in New York May 23-25. The 3-day program includes presentations on advances in engineering, research, chemistry, and gas-production techniques of interest to operating men of the natural-gas industry.

The conference will be made up of two morning and one afternoon general sessions, under sponsorship of the association's gas production and chemical committees. Parallel sessions for each group will be held on two afternoons. H. C. Jones, New England Power Service Co., Boston, chairman of A.G.A.'s gas production committee, and Dr. F. E. Vandaveer, East Ohio Gas Co., Cleveland, chairman of the chemical committee, will alternate as presiding officers.

Among speakers will be E. S. Pettyjohn, director, Institute of Gas Technology, who will talk on potential use of catalytic and thermal hydrocarbon cracking in the gas industry. Also on the agenda are a paper on "Nuclear Energy Developments," by Dr. Kenneth H. Kingdom, Knolls Atomic Power Laboratory for General Electric Co.; a paper on "Effect of Oxygen in Gas Upon Gas-Distribution Systems," by Frank P. Mueller, Peoples Gas Light & Coke Co., Chicago; and a panel discussion, will be held to review present-day high B.t.u. production methods.

Three Firms Agree to Buy Gas From Trunkline System

Three natural-gas distributors have agreed to purchase approximately 70 per cent of the estimated output of the proposed 26-in. pipe line from Louisiana to Iowa, of Trunkline Gas Supply Co.

Attorneys for the distributors, Minneapolis Gas Co., Northern States Power Co., St. Paul, and Metropolitan Utilities District at Omaha, committed their organizations to buy the gas, before Federal Power Commission during closing arguments of Trunkline's application for permission to build the $90,000,000 project.

Trunkline based its application on an estimated sale of 250,000,000,000 cu. ft. of gas daily to Northern Natural Gas Co., which sells gas to 31 distributors in seven states.

Firm Gains New Customers

Cities Service Gas Co. now serves 19,624 more customers than it did a year ago, a recent report shows. Total is 463,055, representing a population of 1,630,328, in 347 different distributing centers.

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CRUTCHER-ROLFS-CUMMINGS, INC.
Pipe Line Equipment and Materials
Houston - Tulsa

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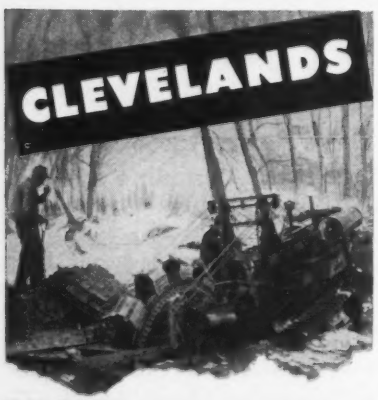

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PIPE LINES

Texas Pipe Line Co. Lets South Texas Contracts

Texas Pipe Line Co. has let contracts for construction of approximately 47 miles of pipe lines in South Texas, and for taking up and reconditioning 60 miles of lines, R. B. McLaughlin, president, announced last week.

Latex Construction Co., Houston, was given contract for 16.25 miles of 6⅝-in. line from Manvel Station to the Chocolate Bayou field, and 2.6 miles of gathering lines in the field. Latex also will take up and recondition 44.5 miles of 8⅝-in. line between Blue Lake Junction, Brazoria County, and the Houston ship channel, and 2 miles of gathering lines in the Manvel field.

Approximately 15 miles of pipe line between Withers Station and the Picket Ridge, Kubela, and Lakeview fields in Wharton County, will be constructed for the firm by Associated Pipe Line Contractors, Inc., Houston. Of total mileage, 11.93 miles will be a 10¾-in. line.

The firm awarded contract to Sheppard-Geiger Construction Co., Corpus Christi, to construct 13.5 miles of 6⅝-in. pipe line between Markham Station and Blessing Junction, in Matagorda County. The company also will take up 13.5 miles of 4½-in. line between the same two points, and recondition the pipe.

New 1,000-Mile Pipe Line

An account of plans for the new project of Standard Oil Co. (Ohio) and Sun Oil Co. to be undertaken by the jointly owned new Mid-Valley Pipeline Co. as a 1,000-mile crude-oil line from Longview, Tex., to Lima, Ohio, is presented in the news section of this issue.

Transcontinental to Let Contracts on Laying Line

Transcontinental Gas Pipe Line Corp. contracts for the laying of the initial 600 miles of 30-in. for the Texas-New York City line are to be let following the receipt of bids from contractors April 26. The date of receiving bids was postponed from April 15.

Kansas Light Contracts Ulysses-Pratt Pipe Line

Kansas Light & Power Co. has awarded contract to M. J. White Construction Co. for 146 miles of 20 and 22-in. line from Ulysses to Pratt, Kans., on which operations will start in May. Later in the summer, a contract is to be let for 30 miles of 12-in. line.

Chicago Line to Connect With Wisconsin System

Wisconsin Southern Gas Co., Burlington, has been authorized by Federal Power Commission to acquire from Wisconsin Gas & Electric Co. a 25-mile pipe line from Pleasant Prairie to Genoa City, Wis.

The commission also authorized Wisconsin Southern to build a 1.65-mile connecting line from the Genoa City line to the transmission facilities of Natural Gas Pipeline Co. of America, and, with the concurrence of the latter company, ordered it to establish connection with and sell natural gas to Wisconsin Southern. FPC specified, however, that Natural Gas Pipeline Co. would not be required to sell to Wisconsin Southern, under the new order, a greater volume of gas than that allocated to it under Pipeline Co.'s rate schedules on file with the commission.

Purchase price of the 4-in. Genoa City line is $180,000, plus the cost of additions made since December 1, 1946. Estimated cost of constructing the connecting 6-in. line is $29,999. Estimated cost of facilities to be constructed by Natural Gas Pipeline Co. of America is $20,000.

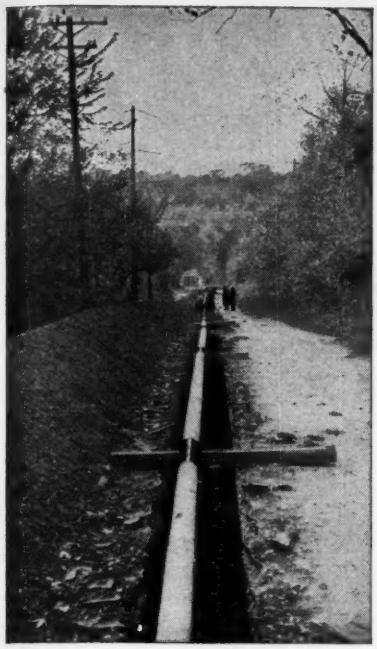
Wisconsin Southern provides natural-gas service to a number of communities in southern Wisconsin.

Harper High Bidder for Louisiana Gas Line

A. B. Harper, Fort Smith, Ark., bid the top price of $5,257,000 for a War Assets Administration natural-gas pipe line in Louisiana, which originally cost $2,800,000. The line is 100 miles long, and runs from near Lake Charles to the communities of Woodlawn, Tepetate, Lakeside, and Chalkley, all in Louisiana.

The Government received eight bids on the line, on which WAA has set as a "fair value" $6,750,000 because "it is now a going concern." Bids will be studied by a board, which will submit them to WAA Administrator Jesse Larson, who will make the final decision.

Other bids on the line were: Fish Engineering Co., Houston, $1,675,000; George A. Butler, Houston, $1,500,000;



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It's so quick and easy to apply ... wraps around the welded pipe joint like tape around a baseball bat.

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Tennessee Gas Transmission Co., Houston, $4,007,000; Mississippi River Fuel Corp., St. Louis, $4,108,000; J. R. Butler, Houston, $2,000,000 and $3,500,000, accompanied by various conditions to suit the two bids; Lake Charles Corp., Shreveport, $4,101,000, and $3,800,000; and Cities Service Refining Corp., New York, $3,860,780.

Imperial Lays Outlet for Golden Spike Discovery

Imperial Pipe Line Co. has completed an 8-mile 8-in. pipe line linking Golden Spike discovery well with the existing Leduc-Woodbend pipeline system. The line now awaits placing on production of 1 Imperial-Schoepp, the discovery well which made two brief 1-hour flow runs and produced oil at 10,000 bbl. daily rate. Imperial Oil, Ltd.'s Golden Spike well has 544 ft. of highly productive oil-bearing Devonian coral reef, nearly four times the maximum pay thickness previously found on the Alberta Canadian plains.

Monterrey Gas Lays Lines

Cia. Mexicana de Gas, S. A. Monterrey, Mexico, is building two coated and wrapped lines with company crews supervised by Travis Dade. Operations of the company are directed by V. H. Golhke, general manager. The lines are 8 miles of 6 in. and 1½ miles of 8 in. for the Monterrey La Leona lateral.

Stanolind Pipe Line's Expansion Is Completed

STANOLIND PIPE LINE CO. in February completed a 4-year, $80,000,000 modernization and expansion program that almost doubled its crude-oil delivering facilities.

The over-all effect of the program was to increase daily deliveries out of the system from 275,000 bbl. in 1944 to 397,000 bbl. in 1948, and to a capacity of 475,000 bbl. before the end of 1949.

Common denominator of pipe lines is barrel-miles. In 18 years, Stanolind Pipe Line Co. traffic increased from less than 21 to more than 76 billion barrel-miles. Although there are 71 pipe-line companies reporting to the Interstate Commerce Commission, Stanolind in 1947 transported 14.21 per cent of the traffic of the pipe-line industry.

Stanolind mileage represented 8½ per cent of the oil pipe-line industry mileage in 1947. This figure was established through the completion of long extensions or loops, or construction of new line, on the West Texas-Drumright-Ada line, the Drumright-Chicago line, and the Wyoming line.

The company now has a trunk-line system of 8,130 miles and gathering

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During our fiscal year, ending Nov. 30, 1948, five spreads of Latex Construction Company laid and took up a grand total of 1369* miles of pipe. This imposing mileage of pipe line work was divided as follows:

Miles of Pipe laid, 16" and larger.....588
Miles of Pipe laid, 8", 10" and 12"...379
Miles of Pipe taken-up and reconditioned..402

**This figure does not include the mileage under contract at the end of 1948, to be completed during 1949, amounting to 181 miles.*

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General Contractors
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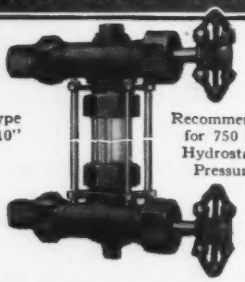

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Recommended for 750 lb. Hydrostatic Pressure

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This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

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systems totaling 2,970 miles. There 93 main-line pump stations developing 120,000 hp.

There are over 10,000 lease-tank connections from which approximately 250,000 bbl. of oil per day are drawn.

The expansion and modernization program was planned in 1945 to meet estimated traffic demands for 1950. Postwar demand for petroleum products far exceeded estimates, and the more than 25 refineries served directly or indirectly by Stanolind Pipe Line required greater volumes of crude than had been anticipated. So the firm rushed its program to completion a year earlier than originally planned. With the completion of 63.27 miles of 12-in. line from LaPlata, Mo., to Wood River, Ill., in February, the original $80,000,000 program was terminated successfully.

The company is a long-distance carrier — each barrel of crude oil transported through the trunk system moves an average of 671 miles. The longest haul locally on its system is from Elk Basin, Wyo., to Whiting, Ind., some 1,400 miles, and requires approximately 36 days. The system crosses arid, semidesert country, marshes, the mountains of Wyoming, and farmlands of Missouri and Illinois. Bridging some narrow streams, the pipe is buried below the scour depth under navigable rivers. The company has seven lines crossing the Mississippi River.

Construction of new extensions and loops was comparatively light in 1945, increased in 1946, increased further in 1947, and continued heavy in 1948. Extensions built in 1945 were 71.28 miles of 8-in. from Lysite Junction to Steamboat Butte; 11.91 miles of 6-in. from Maverick Station to Steamboat Butte, and 7.42 miles of 6-in. from Winkleman Dome to Pilot Butte—all in Wyoming.

In 1946, an extension of 34.54 miles of 16-in. was laid from Slaughter to Wasson in West Texas, and 19.85 miles of 8-in. from Manhattan to Lemont in Illinois. Loops were constructed as follows: 148.06 miles of 20-in. from Freeman to LaPlata in Missouri; 4.95 miles of 16-in. from Shopton Junction, Iowa, across the Mississippi River to East Fort Madison, Ill.; 30.39 miles of 18-in. from Manhattan to Little Calumet River Junction, Illinois, and 4.45 miles of 14-in. from Monee Junction to Steger Junction in Illinois.

Three new stations — Pilot Butte, Maverick Springs, and Winkleman Dome, all in Wyoming—were constructed in 1945, and one in 1946 at Waurika, Okla. The big year was 1947 when 11 new stations were built. They were: Caprock, N. M.; Post and Childress, Tex.; El Reno, Okla.; Turon, Kans.; Auburn and Center, Mo.; Wheeler and Fullerton, Tex., and Hamilton Dome and Lost Cabin, Wyo. Construction in 1948 included a new station at Casper, Wyo.

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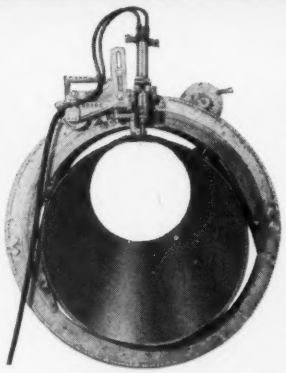
PIPE CUTTING AND BEVELING MACHINE



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Machines to cut and bevel 16" pipe and over are furnished with out-of-round attachment. Machines to cut and bevel 14" pipe and under are furnished with standard torch holder.

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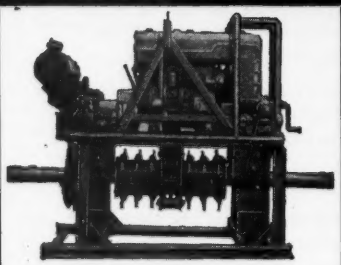

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Model KX—30" to 34" pipeline machine

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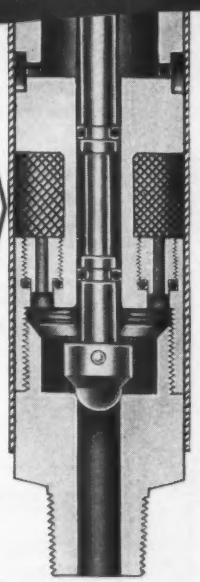

The "O-CF" Valve is controlled through a combination of injection gas pressure and tubing pressure. This eliminates the drop in injection pressure required with ordinary pressure-charged valves. All available injection pressure can be used right down to the lowest valve in the string.

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All valves in each string are charged to the same pressure; consequently, the same injection gas pressure is used right down to the lowest valve. This means that fewer valves are required . . . tremendous volumes of fluid can be lifted . . . with gas/fluid ratios lower than ever before! Under most conditions, an ordinary surface choke to regulate injection gas is the only control required.

This new valve also permits full use of available injection pressure on intermittent-type wells. In such wells, "O-CF" valves are used for unloading purposes only; actual production is through one regular Type "O" Valve at the bottom of the string.

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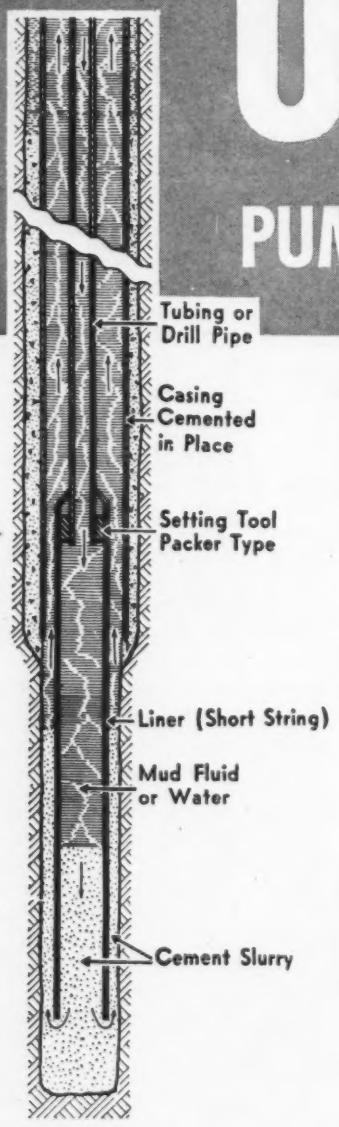

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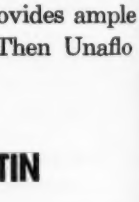

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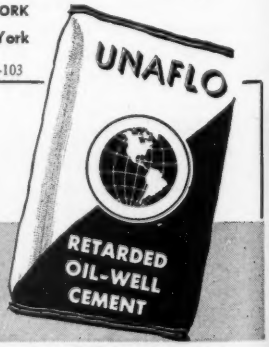

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Exploration and Drilling

New Ellenburger Strike for New Mexico

AMERADA PETROLEUM CORP. 1 BTA State, NW SE 2-12s-33e, in the northwestern part of Lea County, New Mexico, on drill-stem test of the Ellenburger pay, flowed 70 bbl. per hour of 46.2°-gravity oil for 4 hours, through at ⅝-in. bottom and 1-in. top choke, from the interval at 10,819-39 ft. Last reports had the well drilling at total depth of 10,870 ft., still in the pay, but no later drill-stem tests had been made. On a previous drill-stem test at 10,794-11,819 ft., the well flowed 294 bbl. in 4 hours.

This well had already given indications of making 60 bbl. per hour from a Pennsylvanian pay at around 9,000 ft. *(The Oil and Gas Journal. March 17, 1949, page 207).*

Although most reports give the pay as Devonian, Amerada geologists insist that it is Ellenburger, and that the so-called Devonian pay in Crossroads pool some 20 miles to the northeast is also Ellenburger. They base their opinion on two things. First, they assert that in this region, wherever Devonian underlies Mississippian, the Woodford is present. There is no Woodford in either Crossroads or the Amerada test. As additional confirmation, Amerada people say that the lithology of the lime bears little resemblance to the type of Devonian to be expected; but that it does check reasonably well with Ellenburger lithology.

An unusual characteristic of the oil flow was the fact that gas-oil ratio was almost negligible, 25 cu. ft. per barrel. This looks like an undersaturated crude with a tremendous water drive in the reservoir. Oddly enough, the Pennsylvanian pay in this well had a pretty low gas-oil ratio, certainly under 2,000 cu. ft. per barrel, but that pay also indicated it packed a "wallop," suggesting water drive there, too. It is reported that flowing pressures on test from the Ellenburger started at 2,400 psi. and ran up to 4,000 psi.

Tops on the Amerada well are: Pennsylvanian —4,400 ft., Mississippian —6,075 ft., and Ellenburger —6,534 ft. Comparative tops in Crossroads field are: Pennsylvanian —5,476 ft. to —5,541 ft., Mississippian —7,256 ft. to —7,877 ft., Ellenburger —7,696 ft. to —8,482 ft. Pennsylvanian tops are subject to differences of opinion from company to company; but Mississippian and Ellenburger (which is usually called Devonian at Crossroads) tops should be pretty reliable. Comparing discovery wells (the Crossroads discovery was not the highest well after development wells were drilled); the Amerada well is 1,466 ft. higher on the Mississippian top, and 1,538 ft. high on the Ellenburger. The Amerada well had 459 ft. of Mississippian against 531 ft. for Crossroads discovery well.

The Amerada well has many of the earmarks of a really big discovery. In addition it adds substantial interest to the oil possibilities of a basin that obviously exists north of the westward trending Central Basin platform. From the Texas-New Mexico line this basin dips westward and then at some point begins to rise. It is definitely rising to the west at the Pecos River. The deepest part of this basin lies somewhere south of the Amerada well. Phillips Petroleum Co. 4 Lea-Mex. in 17-17s-33e, on the east end of the old Maljamar field just barely reached the Mississipian at 13,998 ft., compared to 10,310 ft. in the Amerada well. How far north this basin extends remains for more drilling to determine.

With the Amerada strike looking like something very big in both the Pennsylvanian and Ellenburger; and with Crossroads looking like a good field, the new basin is off to a flying start as an oil prospect.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

SOUTHEAST NEW MEXICO.—Amerada's 1-BTA State, Pennsylvanian and Devonian discovery, found additional pay on drill-stem tests to 10,889 ft. Some sources believed the lower tests might be Ellenburger. A 4-hour test from 10,819-39 ft. flowed 280 bbl. of oil and recovered 9,530 ft. of oil in the pipe. A later test from 10,840-89 ft. produced an average flow of about 13 bbl. of oil an hour, and was still open at last report.

WEST CENTRAL TEXAS.—Woods Drilling Co. 1 Radford & Shell, Canyon sand discovery west of Royston, gaged 460 bbl. of oil on completion tests after a 10-qt. shot in open hole at 4,732-38 ft.

WEST TEXAS.—With the discovery this week of what appears to be the best production so far in the Pennsylvanian Canyon limestone at Ryan et al 1 Brown, 3 miles south of the same type producing formation in the North Snyder field, observers have expressed the belief of a possible 10-mile long section between Magnolia's 1 Moore and 1 Winston discoveries, southwest of the town of Snyder, and the North Snyder field. Reports have indicated that the new well and those at North Snyder check about flat on the pay formation.

ROCKY MOUNTAIN AREA.—On swab test at the Esperado Mining Co. Northwest Lodgepole, Wyoming, wildcat, the well made 40 bbl. of oil per hour for the first 3 hours, and tests are continuing. Continental Oil Co. found oil on tests of a stray sand in an extension well at Sussex, Wyoming. Hanlon et al are deepening their upper Amsden gas discovery, Devil's Pocket, Montana, for a test of basal Amsden.

CANADA.—Imperial-Schoepp 1, Golden Spike discovery, gaged 500 bbl. of oil per hour on production test. Company officials rate the estimate of the well's potential as high as 10,000 bbl. per day, the greatest ever made by any Canadian producer. Redwater field has been extended 2 miles westward by Western-Minerals 16-17, which recovered 614 bbl. of oil per day on restricted flow tests.

EASTERN TEXAS

Wood County Test Shows Sub-Clarksville Production

DALLAS.—Fred B. Wonder Yoya 1 Mary Saxon, in the southeast corner of a 40-acre tract in the S. W. Mitchell Survey, reported 82 ft. of oil-bearing sub-Clarksville, topped at 4,802 ft. Operators prepared to run production tests. Location is a northeast outpost to Merigale-Paul field of Wood County.

In Nacogdoches County, 3 miles south of Sacul (northwest corner of county, Highway 204), Sun Oil Co. 1 Dedman, J. M. Musquez Survey, had top of the Woodbine at 4,790 ft. Cores from 4,749-4,802 ft. were said to have a slight show of gas, but a drill-stem test from 4,790-4,802 ft. recovered 60 ft. of mud and 1,240 ft. of salt water in 15 minutes. According to reports, it was to be abandoned.

Humble Oil & Refining Co. 1 Crawford, Z. Bennett Survey, 12 miles northwest of Trawick in Nacogdoches County, had total depth at 8,257 ft. in sandy shale of the Travis Peak. This well was said to have found gas-distillate possibilities in the Rodessa section, but apparently has had no shows in the Travis Peak.

In the Cusetta area of Cass County, Humble 1 Guerin, James Frazier Survey, was drilling ahead below 5,224 ft. It is scheduled to the Smackover.

A new 4,500-ft. wildcat for southwestern Grayson County was announced by Seitz, Comegy & Seitz, as their 1 B. Williams, 330 ft. from north and east lines of a 120-acre tract in the south half of the S. Asbery Survey, 2½ miles southwest of Collinsville. The location is offset by dry holes on the northeast, east and southeast, all below 4,000 ft.

In northwestern Grayson County, L. O. McMillan 1 J. R. Greer, J. P. Weaver Survey, on the north edge of Sandusky, was drilling below 7,000 ft.

In Denton County, 5½ miles southwest of Lewisville, J. J. Tyrell 1 R. L. Donald, J. White Survey, was drilling below 2,300 ft. Various rumors have credited the exploration to be an 8,000-ft. test.

Humble was reported planning another wildcat in the Hemphill area of Sabine County some 3,000 ft. north of its 1 Minton, Shadrack Morris Survey. The latter test lost returns at 6,535 ft. and a number of weeks were spent in trying to restore circulation and cementing sides of the well. The 1 Minton had top of the Upper Glen Rose at 6,117 ft.

On the Harrison County side of the Longwood field, Union Producing Co. 1 Bergin, J. Marshall Survey, 9 miles northeast of Beckville, was looking for top of the Pettit in coring below 6,210 ft. Fifty feet of recovery from 6,160-6,210 ft. was shale and lime with no shows.

In the same area, Placid Oil Co. 1 Winston, Perry Survey, was drilling below 7,356 ft. in hard sand and shale of the Cotton Valley.

EAST TEXAS (DISTRICTS 5 & 6) WILDCAT FAILURES

Anderson County: The Texas Co. 3 G. A. Wright, James Madden Sur., 6½ mi. SW Palestine, dry, TD 3,995 ft., Pecan 1,903 ft., Austin 3,415 ft., Woodbine 3,843 ft., Comanche 3,925 ft., by samples, elev. 315 ft.

Bosque County: Southland Oils, Inc., 1 Turner Greenwade, Mary Cole Sur., 10 mi. E Whitney, dry, TD 7,241 ft. in Ellenburger, top not reported.

Cherokee County: R. J. Caraway 1 J. W. Thompson, S. Herndon Sur. 467, 4 mi. S Rusk, dry, TD 5,106 ft., Woodbine 5,104 ft. had small amount of oil and salt water.

Kaufman County: Tulsa Iron & Metal Co. 1 O. B. Jackson, John Ables Sur. 4, 9 mi. NE Kaufman, dry, TD 5,012 ft., Nacatoch 650 ft., Pecan 1,610 ft., Austin 2,300 ft., sub-Clarksville 2,893 ft., Woodbine 3,335 ft., Georgetown 4,010 ft., Goodland 4,840 ft., Paluxy 4,920 ft., elev. 482 ft.

McLennan County: John A. Bivings 1 Adolph Schaeper, M. Martinez Sur., 2 mi. SW Robinson, dry, TD 1,405 ft., Edwards lime 940 ft., elev. 590 ft.

Navarro County: Intex Oil Co. 1 Lynn Adams, Matthew Boren League, 1½ mi. E Currie, dry, TD 3,112 ft., Woodbine 3,004 ft. by samples, elev. 394 ft.

Titus County: W. M. Coats 1 Lizzie Scott, Allen Samuel Sur., 14 mi. E Talco, dry, TD 4,790 ft., Pecan 1,849 ft., Woodbine 3,295 ft., Comanche 3,705 ft., Fort Worth 4,033 ft., by samples, Paluxy 4,565 ft. by log, elev. 285 ft.

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SOUTH LOUISIANA

Mallard Bay Area Gets New Pool

NEW ORLEANS.—A new oil field has been opened in the Mallard Bay area of Cameron Parish by Martex Realization Corp. et al (formerly Cecil Hagen) 1 A. E. White, 14-13s-3w. Drilled to a total depth of 10,642 ft., with 5½-in. casing cemented to 10,410 ft., completion was made in the shallow sand, with four other pays believed productive. Perforations were made from 6,712-20 ft. and 6,723-29 ft. for the flow. On a drill-stem test using 9/64-in. top and ¼-in. bottom chokes, and 4,000 ft. of cushion, the well flowed at the rate of approximately 150 bbl. of 39.8°-gravity oil, flowing pressure 1,400 psi.

The discovery well for the Pelican Island area of Plaquemines Parish, 8 miles offshore and 12 miles south of Bastian Bay field, is Humble Oil & Refining Co. 1 Pelican Island State Lease Account 1, Block 30. Drilled to a total depth of 7,500 ft., this well was plugged back to complete in the 2,500-ft. sand. Perforations were made from 2,169-83 ft., and through a 3/16-in. choke the well flowed at the rate of 28,200 cu. ft. of gas per day with 710 psi. flowing pressure on the tubing. Sands showing oil were reported from 2,152-85 ft. just above the salt which was topped at 2,983 ft.

Kerr-McGee Oil Industries, Inc., completed their 2 State Lease 755, Block 33, in a new oil sand for the Block 32 field, in the Gulf of Mexico offshore Terrebonne Parish. Total depth is 3,344 ft. in salt, and on potential test the well flowed 312 bbl. of 29°-gravity oil per day through a 16/64-in. choke. Top of sand is 2,663 ft., with perforations from 2,663-78 ft. for the completion.

Magnolia Petroleum Co. 2 Abel West Heirs, a wildcat in the Holly Beach area, Cameron Parish, 27-14s-10w, 3 miles northeast of the 1 Abel West Heirs discovery at Holly Beach, is testing through perforations at 11,410-40 ft., where 1½ bbl. of 18.9°-gravity oil per hour was recovered on a previous test. Total depth of the well is 11,896 ft., with 7-in. casing cemented to 11,427 ft.

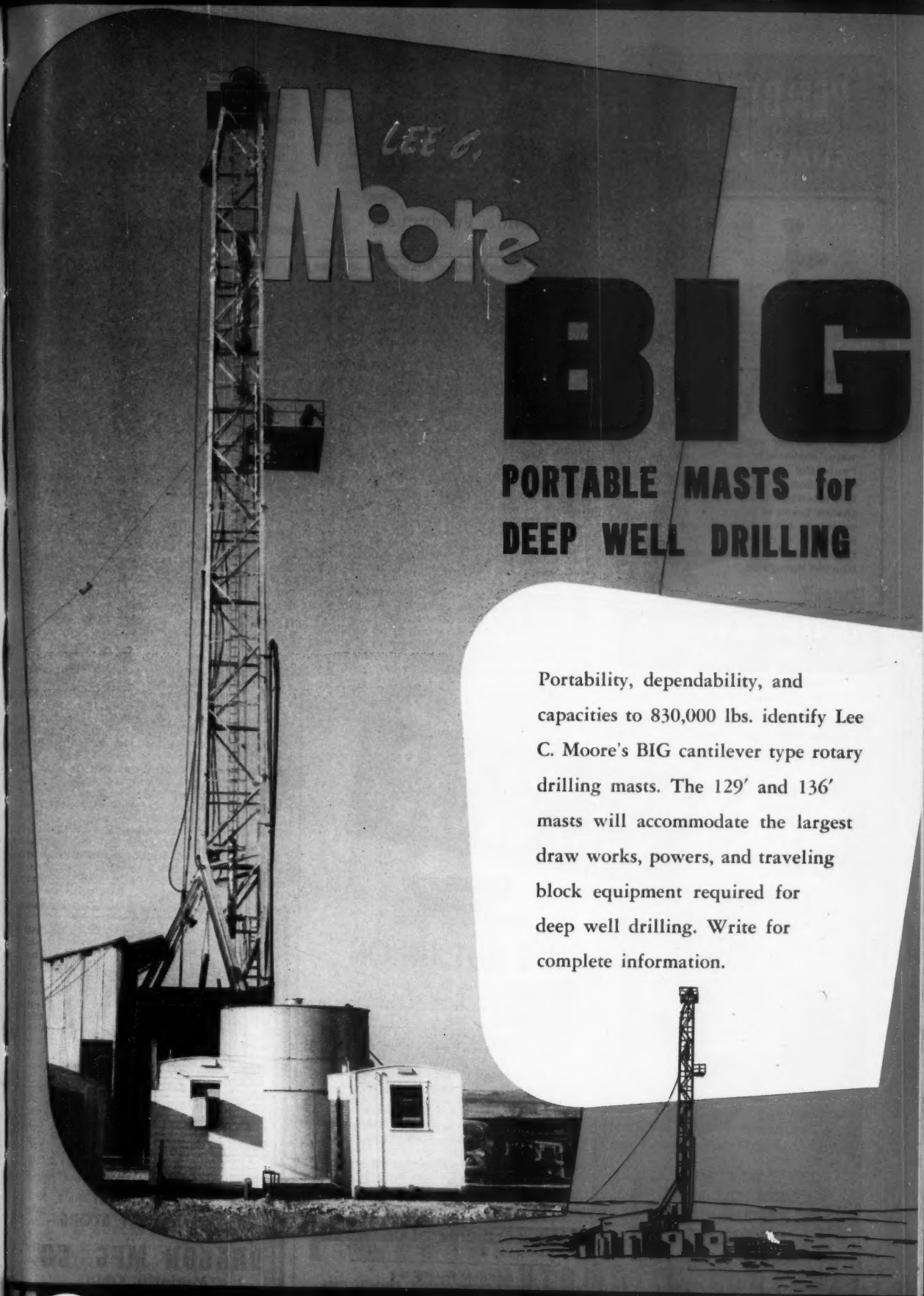
SOUTH LOUISIANA SUCCESSFUL WILDCATS

Plaquemines Parish: New gas discovery—Humble 1 Pelican Island State Lease Account 1, Tract 1202, Block 30 of West Delta area, 8 mi. offshore and 12 mi. S of Bastian Bay field, TD 7,500 ft., top sand 2,169 ft., perf. 2,169-83 ft., IP: 28,200 cu. ft. gas per day through 3/16-in. choke and shut in, tubing pressure 710 psi.

Terrebonne Parish: New sand, Block 32—Kerr-McGee Oil Industries, Inc., 2 State Lease 755, Block 33, in Gulf of Mexico, TD 3,344 ft., top sand 2,663 ft., perf. 2,663-78 ft., IP: 312 bbl. of 29°-gravity oil per day through 16/64-in. choke, GOR 100, TP 125 psi.

SOUTH LOUISIANA WILDCAT FAILURES

Calcasieu Parish: Placid Oil Co. 1 W. D. Jones et al, 20-9s-7w, dry, TD 3,607 ft.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Terrebonne Parish: Superior Oil Co. 1 Turtle Bayou St. Lease 1612, 27-19s-15e, 2 mi. NW of De Farge production, dry, TD 12,851 ft.

SOUTHWEST TEXAS

Guadalupe County Test Finds Buda Production

CORPUS CHRISTI. — Parker Petroleum Co. 1 Otto Engelke, wildcat in Guadalupe County, is preparing to complete on the pump for a new oil discovery in the Buda lime. Total depth is 2,170 ft., and the well is expected to produce from 40 to 50 bbl. of 40°-gravity oil per day on completion. This well is in Harriett Cottle Survey, 9 miles southwest of Luling.

In Caldwell County, R. V. Muckelroy 1 Dave & Joseph, in the Byrd Lockhart Survey, gaged on potential test 60.66 bbl. of 41°-gravity oil per day on the pump, with no water. Production is from pay section topped at 1,603 ft. in the Austin chalk. Total depth is 1,637 ft., with 7-in. casing set to 1,596 ft. for completion in open hole at 1,596-1,637 ft.

The first oil producer in the new southeast extension sector at La Reforma field, Hidalgo County, is Baldridge & King, Inc., 2 Adela Barrera Betancourt. On completion test, the well flowed 118 bbl. of oil per day through a 3/32-in. choke, with 1,100 psi. tubing pressure, casing sealed. This well is located in Tract 12, Share 7, San Jose Grant.

A new pay zone for Sarita field, Kenedy County, has been opened by Humble Oil & Refining Co. B-9 Kenedy, in El Paistle Grant. Drilled to a total depth of 9,501 ft., the well was completed flowing at the rate of 113 bbl. of fluid per day, or 110 bbl. of oil per day through ⅛-in. choke with 800 psi. working pressure, on a 2-hour drill-stem test. The test was made through perforations at 6,258-68 ft. and flowed 40.8°-gravity oil.

Clark Fuel Producing Co. 2 Daskam, a new oil pay sand discovery in the Cecil field extension area, Hidalgo County, is reported to have flowed oil at the rate of 6 bbl. per day through perforations at 4,260-63 ft. Total depth is 4,270 ft., with 5½-in. casing on bottom. This well is located in Lot 27, Porcion 45, 1½ miles southeast of the Cecil field discovery well.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCATS

Caldwell County: New oil discovery—R. V. Muckelroy 1 Dave & Joseph, Byrd Lockhart Sur., 1½ mi. E of Lockhart, TD 1,637 ft., open hole 1,596-1,637 ft., IP: 61 bbl. oil per day on pump, no gas, gravity 41°, top Austin chalk 1,623 ft.

Nueces County: New oil pay, South Richard King (Bailey field)—Skelly Co. 1 Minerva Patch, Sec. 29, Richard King Farm Lots, top pay 5,440 ft., TD 6,600 ft., perf. 5,450-56 ft., IP: 121 bbl. oil per day through ⅛-in. choke, GOR 697, TP 785 psi., casing sealed, gravity 38.1°.

Starr County: New oil pay, Coastal field—Coastal Refineries, Inc., and W. D. Kennard 1 Louis Pena, Tract 151, Porcion 38, top pay 4,074 ft., TD 4,437 ft., perf. 4,074-78 ft., IP: 22 bbl. oil per day through 5/16-in. choke, GOR 108, TP 100 psi., CP 400 psi., gravity 44.6°.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Duval County: Argo Oil Corp. 1 W. H. Sling et al, BS&F Sur. 117, 4 mi. NE of Seven Sisters, dry, TD 3,287 ft.

W. L. Goldston 1 Ed Canales, SA&MG Sur. 2, dry, TD 4,639 ft.

Guadalupe County: Luling Oil & Development Co. 1 Oscar Vinyard, Geo. B. Allen Sur., 1 mi. SW of Staples, dry, TD 1,142 ft. in Edwards lime.

Jim Hogg County: Amerada Petroleum Corp. 1 Humberto Martinez, Share 1, Las Animas Grant, 1 mi. E of Lefevre field, dry, TD 3,505 ft.

Jim Wells County: Amerada Petroleum Co. 1 Dan W. Risinger et al, San Diego de Abajo Grant, 4 mi. NE of San Diego, dry, TD 7,013 ft.

LaSalle County: Ray Clark and Jack Kidd, Jr., 2 Madge Yeager et al, Sec. 7, Wallace Subd. of Yeager Ranch, Henry Sikes Sur. 110, 25 mi. NW of Freer, dry, TD 708 ft.

San Patricio County: Renwar Oil Corp. 1 Maryland Trust Co., Lot 7, Peterson Subd., 3,795 ft. SW of Aransas-San Patricio county line, dry, TD 7,513 ft.

Starr County: Wood Oil Co. 1 H. P. Guer-

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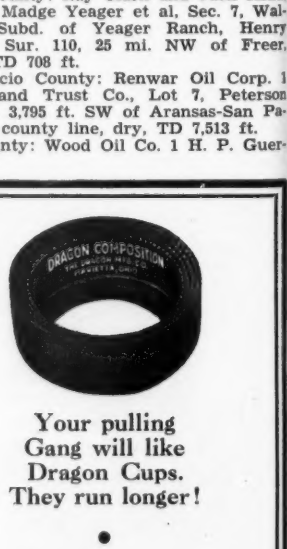

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ra, Share 253, Porcion 69, 10 mi. N of Roma, dry, TD 4,422 ft.

Webb County: Gordon W. Johnson A-1 Mabel Adami, Sec. 343, 12 mi. S of Adami field, dry, TD 1,027 ft.

N. CENTRAL TEXAS

Nolan County Prospect Tests Ellenburger Oil

WICHITA FALLS.—G. H. Brodie and Hunt Oil Co. 1 J. P. Aycock, Ellenburger prospect 4 miles southeast of Sweetwater in Nolan County, held the interest of West Central Texas operators this week. The well had top of the Ellenburger at 6,145 ft. A drill-stem test at 5,651-60 ft. recovered 180 ft. of oil and gas-cut mud and 270 ft. of salt water. Then a 3-hour test from 6,156-66 ft., total depth, recovered 5,000 ft. of clean oil, plus 10 ft. of oil-cut mud, with no water. Flowing pressure was 1,600 psi. and shut-in pressure was 2,000 psi. Operators ran electrical survey and set pipe to 6,150 ft.

Location of the Aycock in Section 58-21-T&P Survey, places it about 2 miles south of Sohio Petroleum Co. and Hunt's 1 Favor, which completed for 180 bbl. of oil daily from the Ellenburger at 6,147-93 ft. The 1 Favor later was taken off production when content increased sharply and oil production dropped.

Two miles west of Sweetwater, Ohio Oil Co. 1 City of Sweetwater, 43-22-T&P, was drilling ahead below 6,353 ft at last report. One-hour drill-stem tests from 6,245-87 ft. and 6,248-6,302 ft. recovered drilling mud with no shows. A 1-hour test from 6,302-50 ft. recovered 33 ft. of slightly oil-cut mud.

Southwest of Trent, Iowa-Payne Oil Co. 1 N. L. McLeod, Ellenburger exploration in 44-19-T&P, was looking for the top of that formation in drilling below 4,950 ft.

Haskell County.—Humble Oil & Refining Co. 1 C. G. Burson, Jr., 8 miles southwest of Weinert in Subdivision 12, J. Korus Survey, prepared to plug back and try for completion in the Strawn after failing in the Ellenburger. A drill-stem test of the latter formation from 5,930-42 ft. recovered 70 ft. of mud with no shows, in 1 hour. Previous drill-stem tests and favorable showings logged in sand streaks at 4,737-74 ft. indicated commercial production.

Fisher County.—Final gage was awaited at Woods Drilling Co. 1 Radford & Shell, Canyon said discovery west of Royston in Section 13, Block R, Barnard Survey. The well made 10 bbl. of oil an hour at 4,738 ft.

Montague County.—Completion tests with various sized chokes were under way at Caraway & Bundy 1 Clingingsmith, conglomerate discovery west of Minor field. In 3½ hours the well gaged 83 bbl. of oil, flowing through 16/64-in. and 32/64-in. chokes from perforations at 6,292-6,302 ft., said to be in the lowest of three conglomerate sections indicating production.

Southwest of Maguire field, C. U. Bay 1 Newland, Section 39, Belcher Survey, was circulating for samples at 5,615 ft., following a test at 5,577-87 ft., which recovered a small amount of gas-cut mud and salt water.

Brown County.—Paul Gardner, Lydia Johnson and others' 1 Hayes, Jual del Gado Survey, extended Caddo production ½ mile north of Madison field with a daily flow of 200 bbl. of oil a day. The well was bottomed at 2,138 ft., with casing perforated from 2,100-10 ft. The flow was gaged through 3/64-in. choke. Acid treatment was with 1,500 gal.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Eastland County: J. J. Lynn 2 Tom Noble, 45-4-H&TC, 2 mi. W Eastland, Cisco area, gaged 4,000,000 cu. ft. gas a day, Caddo 2,963-3,073 ft., TD 3,954 ft., PB 3,170 ft., shut-in pressure 1,125 psi.

Haskell County: Pan American Production Co. 2 W. G. Windeborn, A. F. Burchard Sur., A-14, 4 mi. SE Sagerton, pumped 20 bbl. 36°-gravity oil a day, sand 2,918-23 ft., TD 4,860 ft., PB 2,923 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: Hunter Bros. 1 R. E. Sebring, 8-4-H&TC, 4 mi. SW Dundee, dry, TD 3,160 ft., Canyon lime 3,153 ft., with show of oil, had salt water after acidizing.

Brown County: W. R. Cunningham 1 N. B. & Annie Howlett, J. H. Barnwell Sur. 619, 3 mi. NW Brownwood, dry, TD 1,506 ft., sand with oil show 600, 1,360 ft.

Worth Thompson 1 E. F. George, J. M. Jones Sur. 4, 6 mi. NW Bangs, dry, TD 1,278 ft.

Coleman County: R. H. LeBus 1 L. S. West, NW NW SE Sec. 35, BBB&C Sur., 3½ mi. N Valera, dry, TD 3,481 ft., Caddo 3,435 ft.

A. J. Slagter, Jr., and B. G. Ryan 1 Ray McKinney, Sec. 2, A. J. Burford Sur., ½ mi. N Goldsboro, dry, TD 4,147 ft., Gray sand with oil show 3,885 ft., elev. 1,741 ft.

Cook County: J. L. Anderson 1 W. W. Hickerson, W. Weedman Sur., 2 mi. NE Leo, dry, TD 2,292 ft.

J. W. Baldwin 1 C. L. Links, H. Nail Sur., 2 mi. S Hood, dry, TD 1,312 ft.

O. K. Ulrikson 1 L. L. Seagraves, Thomas Cook Sur., 1 mi. NE Era, dry, TD 1,297 ft.

Erath County: Double D. Production Corp. 1 Bill Hohertz, Bartlett Fry Sur., 4 mi. SW Stephenville, dry, TD 3,928 ft., Caddo 3,710 ft., Marble Falls 3,800 ft., elev. 1,338 ft.

Haskell County: American Liberty Oil Co. 1 E. H. Coffman, H. Riggs Sur., 3 mi. NE Weinert, dry, TD 5,885 ft., Ellenburger 5,872 ft., elev. 1,473 ft.

General Crude Oil Co. 1 E. L. Johnson, Sec. 35, Lge. 76, Wise CSL, 6½ mi.

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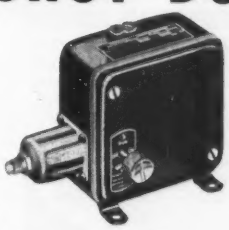

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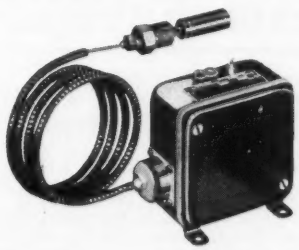

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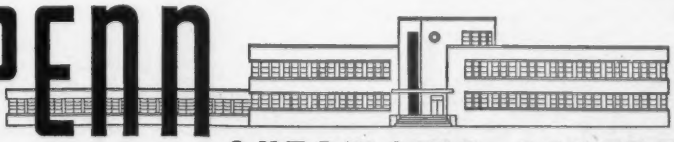

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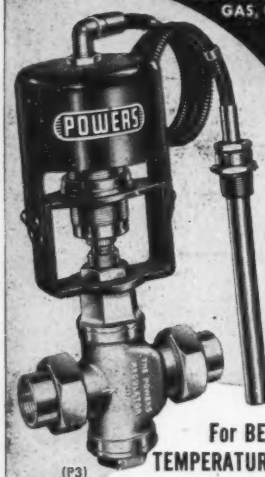

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Knight, Rose & Fair 1 Brenstedt, Blk. 25, James Scott Sur., 3 mi. NE Haskell, dry, TD 4,114 ft., Palo Pinto 3,852 ft., elev. 1,587 ft.

Jack County: Panhandle Production & Refining Co. 1-C T. H. Cherryhomes, J. Henson Sur., 4½ mi. SE Jacksboro, dry, TD 5,285 ft., conglomerate 4,815 ft.

Montague County: W. J. and J. J. Moran 1 Richardson estate, Sec. 29, ETRR Sur., 3½ mi. S Montague, dry, TD 6,660 ft., conglomerate 6,452 ft.

Shackelford County: G. E. Kadane & Sons et al 1 Sanders "AA," Sec. 1564, TE&L Sur., 12½ mi. E Albany, dry, TD 2,102 ft.

Dick Schwab 2 Chloe A. Nail, Sec. 122, ETRR Sur., 15 mi. NW Albany, dry, TD 5,275 ft., Lake sand 4,948 ft.

Stephens County: S. Caprito 1 Carrie Tipton, Sec. 31, B. Abrahams Sur., 12 mi. SW Breckenridge, dry, TD 4,262 ft., Caddo 3,443 ft., Ellenburger 4,200 ft., elev. 1,328 ft.

Taylor County: Robinson & Puckett, Inc., 1 S. A. Bacon, W. M. Smith Sur. 517, 4 mi. NE Tuscola, dry, TD 4,978 ft., Flippen 2,130 ft., Pano Pinto 3,445 ft., gray sand 4,323 ft., Ellenburger 4,866 ft., elev. 2,060 ft.

Throckmorton County: Bridwell Oil Co. 8 J. F. Cook, L. Miers Sur., 10 mi. W Woodson, dry, TD 590 ft.

Wise County: Big Bear Oil Co. 2 J. T. Hunt, C. F. McClain Sur., 5½ mi. NW Chico, dry, TD 5,932 ft., Caddo 5,225 ft., conglomerate 5,262 ft.

Young County: Star Oil Co. 1 H. H. Wray, dry, TD 4,588 ft., Caddo 3,885 ft.

CANADIAN FIELDS

Golden Spike Discovery Meets High Expectations

CALGARY.—The Golden Spike oil discovery, 1 Imperial-Schoepp, about 4 miles west of current Woodbend production, has lived up to the high expectations that the oil industry anticipated, when it was finally placed on production test. An hourly gage of 500 bbl. was recorded at the discovery when two open flow tests, 1 hour in length, were run. Officials estimate the well's potential at 10,000 bbl. daily, by far the largest yet attained at any Canadian oil well.

The 1 Imperial-Schoepp, in LSD 9, 22-51-27w4, was drilled to 6,082 ft., rating 544 ft. of oil-bearing coral reef plus some 155 ft. of additional tight limestone below. Seven-inch casing had previously been set near top of D3 Devonian zone at 5,363 ft. The hole was plugged back to the highly productive oil zone for test of potentialities.

Meanwhile, 2 Imperial-Golden Spike, LSD 3, 1-52-27w4, 2½ miles north and 1½ miles east of Imperial-Schoepp, is drilling below 4,319 ft. Four miles due west of the No. 2 and 2½ miles north and 2½ miles west of the discovery well, 3 Imperial - Golden Spike, in LSD 3, 5-52-27w4, is drilling around 3,400 ft.

Redwater.—The 16-17 Western-Minerals, in LSD 16, 17-57-21w4, added a probable 1,000 acres of proven land to Redwater field when success was assured at this westward extension test. The well, backed by four American independent oil companies: Barnsdall Oil Co., Honolulu Oil Corp., Seaboard Oil Corp. of Delaware, and Los Nietos Co., is located about 2 miles south of Imperial's discovery, and 2 miles west of the most easterly producers.

The well topped D3 zone coral reef limestone at 3,175 ft.—an elevation about 131 ft. above water line at Redwater. K. B. elevation is 2,066 ft. Seven-inch casing was set at 3,182 ft. and drilling was completed 100 ft. deeper. The well was acidized with 500 gal. of 15 per cent acid. An open flow test was not run, but restricted flows through ½-in. choke gave a recovery of 614 bbl. in 24 hours. The well would likely be capable of producing between 1,000 and 2,000 bbl. daily if allowed to flow open.

Manawan Lake.—The A. G. Bailey Co., Ltd., a new firm based at Calgary as petroleum consultants and managers of oil exploration and development operations, in association with Long Island Petroleums, Ltd., of Calgary, started initial wildcat on lands about 35 miles northwest of Edmonton. The new venture, 1 Bailey-Long Island, in LSD 10, 28-57-25w4, is on an eight-section tract obtained from a major oil company on a farmout agreement. Surface casing has been set and drilling will continue within the next few days.

Leduc.—The 1 Hargal - Leduc, D2 zone success on the southeasterly side of Leduc field, has also confirmed oil production from the lower D3 zone of Devonian. During drill-stem test at 5,414 ft., the well flowed oil to the surface in less than 20 minutes after tester was opened, plus a substantially large gas flow rate. The well is situated on a 240-acre lease block in LSD 5, 10-50-26w4. Casing has been set near bottom 5,414 ft., and the well will likely be completed as a D3 oil well.

The 1 Flank-Leduc, LSD 14, 18-50-26w4, D2 zone completion, has been swabbed into production, and is now producing through a ½-in. choke at the rate of 1,000 bbl. daily. Average pressures are: casing 550 psi. and tubing 280 psi. Flank was completed at 5,172 ft., with 7-in. casing set at 5,097 ft.

Eastern Canada.—A summary of drilling operations by Imperial Oil in eastern Canada in 1948 shows that the company had 24 oil and gas wells at Bechar, 8 gas wells at Kimball, and 8 producers in other parts of southwestern Ontario, and drilled a total footage of 55,762 ft. In Quebec, Imperial participated in a Gaspe Peninsula venture that finished dry at 6,350 ft. The company had nine geological parties conducting investigations during the year on the Arctic

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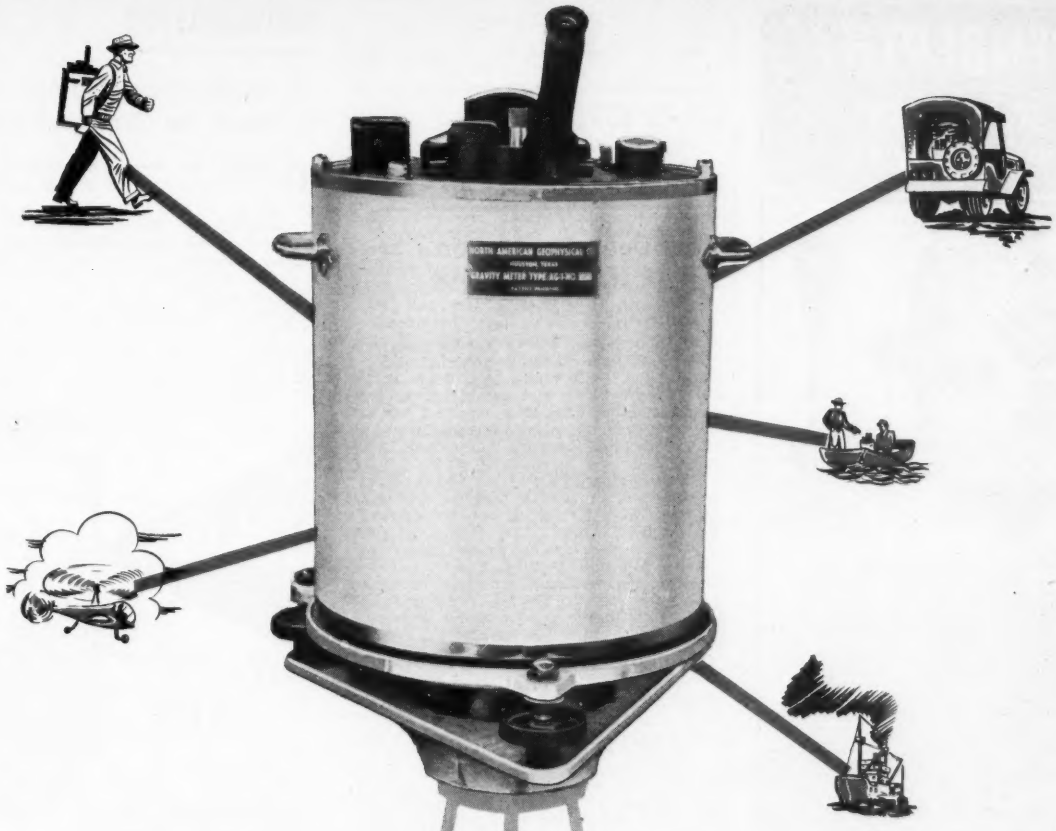

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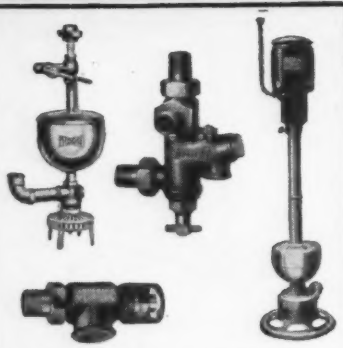

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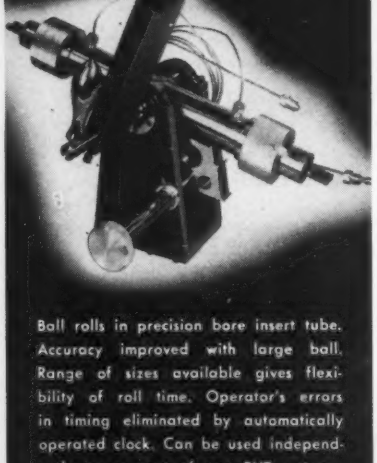

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Wildcat abandonments. — Sun - Langdon CPR 1, LSD 1, 3-23-27w4, TD 8,800 ft. Redwater-Petroleums 2, LSD 1, 29-51-19w4, TD 4,936 ft. Imperial-Spirit River 1, LSD 12, 20-78-6w6, TD 9,847 ft.

TEXAS GULF COAST

New Deep Production Found in Sheriff Field

HOUSTON.—A new deep pay zone at Sheriff field, Calhoun County, has been opened by Quintana Petroleum Corp. 7 C. H. Boyd. Drilled to a total depth of 10,550 ft., this well was completed through perforations at 9,018-42 ft., flowing 187 bbl. of 49°-gravity oil per day through a ⅛-in. choke. Location is on the south flank of the field.

Hassie Hunt Trust 1 Smothers Estate, wildcat test in Lavaca County, J. Chesler Survey, on a drill-stem test at 8,290-8,300 ft. in the Wilcox zone, tested a small amount of gas and condensate, using ¼-in. chokes top and bottom. The well developed 100 psi. working pressure and bottomhole pressures of 925 psi. open and 3,700 psi. shut. Operators are coring ahead below 8,300 ft. This test is 8½ miles southwest of the Provident City field and 6 miles southeast of Ezzell.

The deepest oil producer in the South Gillock field of Galveston County is Pan American Production Co.'s D-1 Kohfeldt Community, which was completed through perforations at 9,334-54 ft. flowing 240 bbl. of 38.5°-gravity oil per day with flowing pressure on the tubing at 900 psi. Gas-oil raio is 605. Total depth is 9,359 ft., with casing cemented on bottom. This well is located in James Smith Survey, Subdivision "K," of the Kohfeldt Resubdivision.

Sun Oil Co. 2 Brown Estate, B. Graner Survey, 1 mile east of Orange Dome in Orange County, is opening a new oil pool. It was drilled to a total depth of 6,602 ft., with 7-in. casing cemented on bottom. Test is now flowing at the rate of 150 bbl. of pipe line oil per day through a ⅛-in. choke with flowing pressure on tubing at 1,200 psi. Gas-oil ratio is 68. Production is through perforations at 6,543½-53½ ft.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Calhoun County: New oil pay, Sheriff field—Quintana Petroleum Corp. 7 C. H. Boyd, Bonifacio Rodriguez Grant, TD 10,550 ft., top pay 9,018 ft., perf. 9,018-42 ft., IP: 187 bbl. 49°-gravity oil per day through ⅛-in. choke, GOR 747.

Wharton County: New gas-condensate pay, Nutchins field—McDannald Oil Co. 1 C. T. Zapp, I&GN Sur. Sec. 15, TD 4,560 ft., top sand 3,120 ft., perf. 3,120-33 ft., IP: 3,154,000 cu. ft. gas per day through ¼-in. choke, open flow calculation 154,000,000 cu. ft. gas per day, TP 1,237 psi., SIP 1,990 psi.

New gas-condensate pay, Lissie field—Magnolia Petroleum Co. 1 Louise Mitchell, GH&H Sur. Sec. 21, 1 mi. W of Lissie, TD 9,740 ft., top sand 9,582 ft., perf. 9,660-80 ft., 9,617-42 ft., 9,582-9,602 ft., IP: 2,033,000 cu. ft. gas per day through 14/64-in. choke, and 60 bbl. 49.7° - gravity condensate per day through 14/64-in. choke.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Galveston County: Sam Maceo, Johnny Mitchell et al 1 Jos. Atkins Est., B. Frank Sur., Bolivar area, dry, TD 7,636 ft.

Goliad County: Bridwell Oil Co. 1 Bertha Haak, J. M. Mancha Sur., 5 mi. SW of Weesatche, dry, TD 5,214 ft.

Karnes County: Callery & Hurt 1 Mrs. S. E. Radford, Mose Nichols Sur., 2½ mi. S of Hondo Creek field, dry, TD 8,256 ft.

Wilson County: Sunray Oil Corp. 1 Theodore Stanush, Wm. Sturrock Sur., 5 mi. W of Lavernia, dry, TD 2,312 ft.

MISSISSIPPI

Good Producer Completed In South La Grange Field

JACKSON.—In South La Grange field, Adams County, J. E. Kemp and Harry W. Elliott 3 E. B. Ogden, 41-6n-2w, has been completed flowing 205 bbl. of 44.5°-gravity oil through 10/64-in. choke, with tubing pressure of 580 psi. Production is through perforations at 6,423-30 ft. Total depth is 6,476 ft.

Humble Oil & Refining Co. 1-B S. B. Dawes et al, 14-9n-8w, was completed on pump for 204 bbl. of 18.4°-gravity oil per

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day. Total depth is 5,154 ft., with perforations at 5,137-53 ft.

Humble 1 F. J. Hubbard, wildcat in 3-4n-8w, Greene County, swabbed 14 hours and recovered 25 bbl. of fluid, 66 per cent oil, 30 per cent basic sediment, and 4 per cent salt water. Gravity of the oil is 23.6°. Perforations are at 7,804-12 ft. Well was shut in 36 hours and fluid rose from 7,300 ft. to 993 ft. Operators now are installing pump.

MISSISSIPPI WILDCAT FAILURES

Adams County: Daryl Davis-Big Chief 1 McKittrick Estate, 17-6n-3w, dry, TD 6,714 ft.

Clarke County: C. Porter Johnson 1 Longbell Lumber Co., 31-3n-17e, dry, TD 4,900 ft.

Grenada County: George S. Engle 1 Loyce Singleton et al, 13-22n-3e, dry, TD 301 ft.

Hinds County: Southeastern Drilling Co. 1 Lewis-Ervin, 27-3n-3w. dry, TD 3,254 ft.

Madison County: Shell Oil Co., Inc., 1 H. C. Timm Co. et al, 34-7n-1e, dry, TD 4,354 ft.

ALABAMA WILDCAT FAILURE

Franklin County: Herbert Ogg and H. D. Easton 1 Audie Harris, C NE SE SW 26-8s-12w, dry, TD 1,485 ft.

OKLAHOMA

New Oil Field Indicated In Grant County Wildcat

CITIES SERVICE OIL CO. 1 Pratt, NE SE NE 6-28n-3w, rank wildcat in northeastern Grant County, flowed 253.28 bbl. of 50.1° gravity (corrected) oil on initial 14-hour production test through various chokes ranging in size from 17/64-in. to 29/64-in. Flow is from Wilcox sand at a total depth of 4,979 ft. with 7-in. casing as 4,970 ft. Gas-oil ratio ranged from 300 to 900 cu. ft. per barrel. Top of the sand zone was called at 4,964 ft. with porosity at 4,969 ft. Following the test, the well was shut in for additional storage.

Location of the well is 5 miles northwest of the North Webb pool, the nearest production, and about 7 miles southeast of the Caldwell State Line pool. It is about 5 miles east of Renfrow, 15 miles northeast of Medford, and about 17 miles northwest of Blackwell.

In Payne County, Eddie Fisher 1 Flohr, SE SE SW 5-18n-2e, a wildcat 2 miles northeast of the Ramsey field and about 5 miles northwest of the recently opened Southeast Ramsey pool, recovered 400 ft. of clean oil in a drill-stem test in the Bartlesville sand at 4,380-92 ft. Casing is being run for a production test. Original objective of the test was the Wilcox.

A. R. Jordon is running 5½-in. casing in his 1 Caudill Estate, SE cor. 27-9n-25w, wildcat in western Beckham County. Although information on the test has been withheld, it is reported that several good showings of oil and gas have been encountered. Total depth is 7,626 ft. Numerous drill-stem tests have been made.

A second drill-stem test has been made in Shell Oil Co., Inc., 1 McKenzie, C NE SW 9-10n-21w, 1½ miles northwest of the nearest production in the Elk City field, Beckham County. Taking in pay at 9,372-9,450 ft., and with the tool open 90 minutes, the well flowed at the rate of 1,510 bbl. of 48.7° oil and 2,925,000 cu. ft. of gas per day. The first test, reported last week, was made higher in the pay at 9,300-75 ft. In this, the well flowed at the rate of 800 bbl. of 59.2° oil (distillate) and 3,750,000 cu. ft. of gas per day. Chokes in both instances were ½-in. on bottom and ⅜-in. on top.

A good showing of live oil with no water and without appreciable gas was reported in a 40-minute drill-stem test at 4,735-64 ft. in Kingery-Patterson and Stonewall Oil & Gas Co. 1 Weeden, SW SW SE 3-2s-6w, Stephens County wildcat. The pay is believed to be the second or B sand of the Deese series.

OKLAHOMA SUCCESSFUL WILDCATS

Grant County: Carter 1 Moore-Daniel, SW SE SE 36-26n-5w, flowed 285 bbl. of 47.5°-gravity oil per day from dolomite at 5,780-5,806 ft. and Marshall at 5,833-44 ft., TD.

Lincoln County: Wegener 1 Logan, NW SE SE 10-14n-4e, pumped 60 bbl. of oil per day from Prue at 3,867-75 ft., TD 3,887 ft.

Okfuskee County: Portable 1 Harge, NW SE NE 31-13n-10e, flowed 9 bbl. of oil per day from Gilcrease at 2,884-96 ft., TD 2,898 ft.

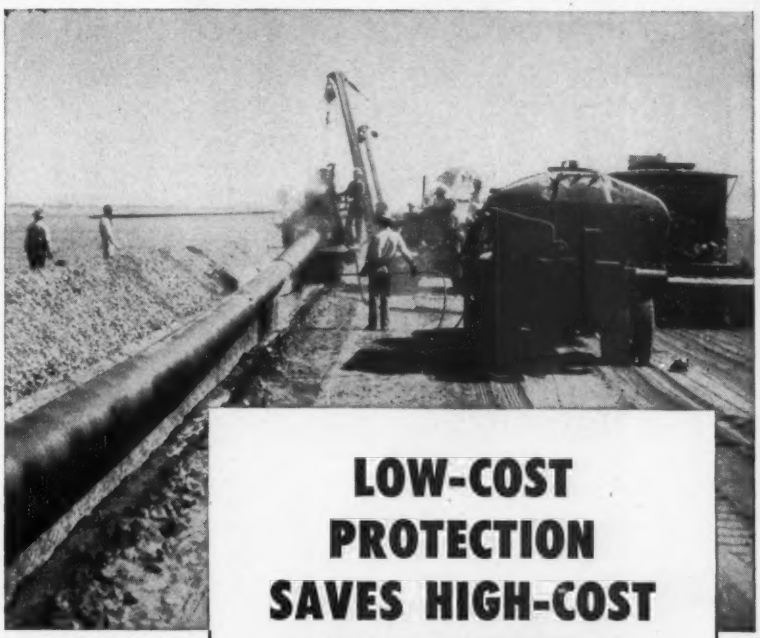
Payne County: Berry 1 O'Keefe, NW SE NW 26-19n-5e, pumped 20 bbl. of oil per day from Peru at 2,804-15 ft., TD 2,816 ft.

OKLAHOMA WILDCAT FAILURES

Cotton County: Nixon 1 Poolaw, SW SE NE 28-5s-12w, dry, TD 2,430 ft., fusilinid lime 1,548 ft., Megargle lime 1,690 ft., Thomas sand 1,722 ft., Gunsight 2,245 ft., lime 2,332 ft., Canyon lime 2,410 ft.

Lincoln County: Fourdee-Rhoades 1 School Land, SE NW NW 16-12n-6e, dry, TD 3,520 ft., Oswego 3,280 ft., Prue 3,303 ft., Skinner 3,480 ft.

Halliburton 1 Humphrey, NE NE SW 2-13n-3e, dry, TD 4,770 ft., Hogshooter 3,024 ft., Checkerboard 3,384 ft., conglomerate sand 3,410 ft., Oswego 4,042 ft., Prue 4,069 ft., Verdigris 4,204 ft., Skinner 4,265 ft., Bartlesville 4,523 ft., Mayes 4,747 ft.



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Logan County: Mohawk 1 Bivert, NW NW SW 22-15n-1e, dry, TD 5,586 ft., Hogshooter 3,862 ft., Layton 3,899 ft., Checkerboard 4,148 ft., Big lime 4,550 ft., Oswego 4,634 ft., first Bartlesville 4,905 ft., second Bartlesville 4,945 ft., unconformity 5,030 ft., Woodford 5,062 ft., Hunton 5,128 ft., Sylvan 5,248 ft., Viola 5,350 ft., dolomite 5,400 ft., first Wilcox 5,490 ft., Second Wilcox 5,524 ft.

Woods 1 McGuire, NE NE SE 2-16n-1w, dry, TD 5,595 ft., Oswego 4,745 ft., Cherogee 4,850 ft., Woodford 5,130 ft., Hunton 5,160 ft., Sylvan 5,250 ft., Viola 5,340 ft., dolomite 5,446 fa., Wilcox 5,485 ft., second Wilcox 5,575 ft.

ROCKY MOUNTAIN

Northwest Lodgepole Area Has Two Good Prospects

DENVER.—Tests of Esperado Mining Co. 1 State, C SE SW 16-45n-67w, in the Northwest Lodgepole area, Weston County, Wyoming, indicate this well will be a new discovery in the Newcastle sand. The well is 8 miles northwest of one drilled by Bay Petroleum Corp. last year, and 24 miles northwest of Mush Creek field, which produces oil from the Newcastle. Esperado drilled the well to 7,718 ft., total depth, and had shows of oil in the Frontier, Newcastle, and Dakota formations. Tests of the Dakota showed water and the well was plugged back to 7,380 ft. several weeks ago. Cable tools have been moved in and the operator swabbed an ungaged amount of oil and mud in cleaning out. After setting overnight, the well filled with 2,000 ft. of oil and initial swab gages were 40 bbl. of 41°-gravity oil per hour for the first 3 hours.

Five miles northeast of the Northwest Lodgepole area, Schlaikjer Brothers are now preparing to test their Hay Creek wildcat at 1 Sterling, C NE SW 33-46n-66w, in the Newcastle sand. The well was carried through the Dakota to 6,446 ft., total depth, and plugged back to 6,229 ft. for tests of the Newcastle, where saturated sand was logged when the well was drilled. Both wells are important as possible pool openers in the so-called trend area along the east side of the Powder River basin. Much Creek, Skull Creek, and Fiddler Creek fields, developed in the past 2 years, have been the most active drilling areas in Wyoming recently. Newcastle production from these fields is now estimated at 8,000 bbl. of oil daily, with a part of the production now shut in due to lack of market.

Recovery of oil on tests in a stray sand in the Steele shale at Continental Oil Co. 4 Unit, NW SW NW 17-42n-78w, in Sussex field, Johnson County, Wyoming, caused interest in this area during the past week. Twelve feet of saturated sand was cored in the well and, on drill-stem test between 4,066-92 ft., there was gas at the surface in 5 minutes, with a recovery of 200 ft. of 40°-gravity oil and 120 ft. of oil-cut mud in 1 hour. The operator is drilling ahead and will complete the well in the Lakota. The well is an extension on the northwest side of the field, ¼ mile northwest of the closest Lakota sand producer. Shows have been encountered in the same sand in two other wells, but the zone has not been previously tested. Continental made the Lakota sand discovery in this field last year, and now has two producing wells. The company is also drilling a 3-mile southeast extension to this field, with the well having a semiwildcat status due to faulting between it and the field proper. This well is now drilling below 6,600 ft. and shows of gas were found in the Wall Creek sands.

William Hanlon et al are now deepening their wildcat in the Devil's Pocket area, Musselshell County, Montana. This wildcat a week ago tested 31,000,000 cu. ft. of sweet gas from the top of the Amsden between 1,405-15 ft. The well is important as a gas

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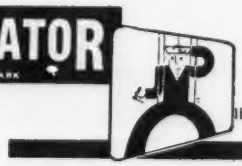

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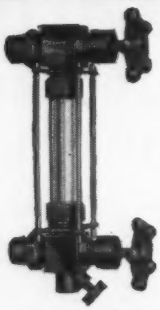

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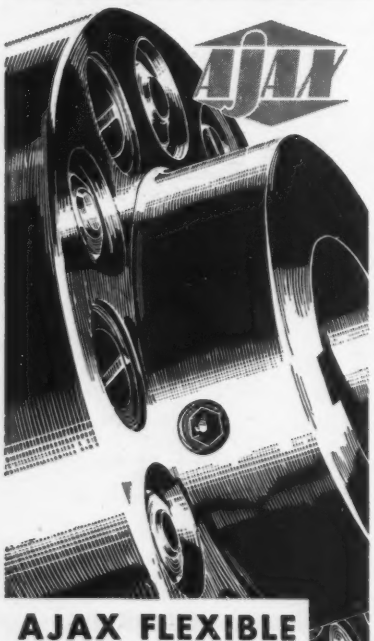

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discovery on the east side of an area where Basal Amsden oil discoveries have been made during the past year. The operator now plans to drill through the gas zone and run casing, then deepen for a test of the lower Amsden zone.

WYOMING WILDCAT FAILURES

Hot Springs County, Warm Springs: Hennepin Crude Corp. 25 Bower-Gray, CW½ NW SW 35-43n-94w, TD 2,217 ft., dry, Madison 1,785 ft.

Sublette County, Pinedale: Stanolind Oil & Gas and Murphy Oil 1 Unit, SE NW SE 17-33n-109w, TD 779 ft., dry, Fort Union, 7,678 ft.

CALIFORNIA

Cuyama Valley May Have Another Big Discovery

LOS ANGELES.—Richfield Oil Corp. is believed to have made another major oil discovery in the Cuyama Valley. Its 1 Homan "A," 35-10n-27w, 5 miles southeast of the nearest production in the Russell Ranch field, has cored at least 250 ft. of highly permeable oil sand, according to well-authenticated reports, and early this week the drill was understood to be still in oil sand at 4,400 ft. The interval has been identified as the Dibblee sand, which is the highly productive sand from which approximately 70 producing wells have been completed in the Russell Ranch field in the last 10 months. The Dibblee zone lies immediately below the Monterey in the Temblor-Vaqueros formation. It is expected that tests of the Homan well will have been completed and the well brought in some time next week.

The discovery strengthens the belief that a series of new fields may ultimately be found in the Cuyama Valley paralleling the line of fields extending from Midway-Sunset to Coalinga in the San Joaquin Valley to the east. The Cuyama Valley, which is located in Santa Barbara and San Luis Obispo counties, is about 50 miles long and about 5 or 6 miles wide. First discovery of oil there was made last June when Richfield, within the month, discovered two light oil pools between 3,000 and 3,500 ft. The company leased extensively before drilling its first well and appears to have most of the productive acreage over these pools, although Hancock Oil Co. has brought in several producers in the White Rock area of the field. Tests drilled to date by other operators have all been unsuccessful.

Richfield is also believed to have most of the land leased around its 1 Homan discovery, although Superior Oil Co. has the south half of Section 25 to the northeast and Wilshire Oil Co. has the north half of that section.

Richfield 1 Perkins deep test, 27-10n-26w, 5 miles east of the new discovery, is being tested by stages, but the outlook for production does not appear very bright, despite a number of oil showings recorded on the electric log. Final outcome of this test, which at 11,870 ft., is by far the deepest prospect hole in the valley, should be known in another week.

Interest of wildcatters in the Newhall area of Los Angeles County has veered to the north since the total failure of the townlot drilling campaign. General Petroleum Corp. has made a location for 1 Circle J, 26-4n-16w, approximately 1 mile north of the town of Newhall and 2 miles west of its Orwig producing property in the Newhall-Placerita area. About 1½ miles northeast of Newhall, the 1 Thompson duster of Rothschild-McBurney Oil Production, 36-4n-16w, abandoned 3 weeks ago, has been acquired by Robert McBurney who will, according to reports, deepen it from its present depth of 2,524 ft. to about 3,600 ft. for a test of the Eocene. This well is about ½ mile west of the General Petroleum Orwig property. Several interested companies have made dry hole commitments, including General Petroleum, Tide Water Associated Oil Co., and Independent Exploration Co.

Development drilling, as well as prospecting, is continuing in the heavy oil area around San Ardo, Monterey County, despite the two cuts in heavy oil prices in California since the first of the year. Wells in the San Ardo field are, as a rule, good for 75 to 125 bbl. of 12°-13° gravity oil per day. Texas Co. has staked locations for three wells west of San Ardo production and three locations were made this week in the field proper. Extensions to San Ardo production have been made to the northeast, southeast and west during the last month. Twelve miles northwest of the town of San Ardo, Humble Oil & Refining Co. is reported to have cored thin streaks of oil sand in its 1 J. J. Barbee et al, 21-21s-8e, and may run a formation test on these stringers. Fifteen miles southeast of San Ardo, Chanslor-Canfield Midway Oil Co. has staked a location for a wildcat, 1 Silva, in the Vinyard School area, 23-24s-12e.

CALIFORNIA WILDCAT FAILURES

Los Angeles County, Boyle Heights area: Boyle Royalties Co. 1 Taylor, 36-1s-13w, dry, elev. 300 ft., TD 4,587 ft.

Fresno County, San Joaquin area: L. M. Lockhart 1-31 Motte, 31-15s-17e, dry, elev. 187 ft., TD 7,215 ft.

Kern County, Blackwells Corner area: Woodward & Reynolds 5 Mabury, 25-26s-18e, dry, elec. 735 ft., base McLure 854 ft., TD 1,175 ft.

Round Mountain area: E. A. Bender 2 S. P., 23-28s-28e, dry, elev. 896 ft., top Vedder 2,634 ft., TD 2,644 ft.

Tejon Hills area: Ewan Oil Co. 1 Ewan, 11-11n-18w, dry, elev. 1,400 ft., weathered granite 505 ft., TD 521 ft.

San Luis Obispo County, Cuyama Valley area: Mid-Cal Petroleum Co. C-9, 9-11n-26w, dry, elev. unknown, TD 1,190 ft.

San Miguel area: Estrella Partnership 1 Kirschenmann, 28-25s-12e, dry, elev. 660 ft., TD 5,178 ft.

Tulare County, Delano area: Humble Oil & Refining Co. 1 McKevitt-DiGiorgio, 20-24s-26e, dry, elev. 388 ft., Famosa 5,363 ft., schist 5,482 ft., TD 5,484 ft.

Ventura County, Rincon area: McCarthy Oil & Gas Co. 1 Hobson, 5-3n-24w, dry, elev. 1,971 ft., TD 5,665 ft.

APPALACHIAN FIELD

Ritchie Co. Test Logs Oriskany at 5,656 Ft.

PITTSBURGH.—In Grant district, Ritchie County, West Virginia, Hope Natural Gas Co. 9300 Powell, wildcat test, logged the Oriskany sand at 5,656 ft., with a slight show of salt water at 5,657 ft. which soon exhausted. Drilling is at 5,668 ft. In Lincoln district, Wayne County, United Fuel Gas Co. 42-6181 F. D. Caldwell, elevation 688 ft., has resumed drilling and has reached 7,780 ft. In Oceana district, Wyoming County, Hope Natural reported a good well in 9324 Ida Scaggs, 1,391,000 cu. ft. of gas in the Big lime, total depth 2,813 ft.

In Napier Township, Bedford County, Pennsylvania, South Penn Oil Co. et al-Snee & Eberly have overcome their fishing job in 1 Jesse B. Miller, elevation 1,666 ft., and are drilling at 3,165 ft. Two good gas wells were reported in ordinary drilling. In Gilpin Township, Armstrong County, A. C. Baker et al 1 Salem Hill Heirs farm, gaged 1,100,000 cu. ft. of gas, total depth 1,521 ft. In West Bethlehem Township, Washington County, J. O. Boyles deepened 1 Albert Donahoo from the Big Injun sand and in the Fifty-Foot and Gordon sands the flow of gas tested 800,000 cu. ft., total depth 2,870 ft.

KANSAS

New Production Opened In Ellis County Wildcats

J. M. HUBER CORP. AND ASSOCIATES 1 Chrisler, NW NW SW 22-11-16, northeastern corner of Ellis County, and 2 miles east of the Bemis-Shutts pool, is showing for a new pool opener in the Lansing-Kansas City lime. With casing perforated at 3,100-12 ft., the well swabbed at the rate of 12 to 14 bbl. per hour for the first 3 hours. Top of the Lansing was called at 3,060 ft. (—1,212 ft.). Hole was drilled to the Arbuckle with total depth at 3,445 ft., but with no showings in the lower horizons, casing was run to 3,210 ft. and hole plugged to the Lansing pay.

On the southside of the same pool, production is being extended ½ mile south and east by Westgate-Greenland Oil Co. 1 Windholtz, SW SW SW 3-12-17. In the Lansing-Kansas City lime, to which the hole was plugged after several unsuccessful attempts to complete in the Arbuckle, the well is swabbing at the rate of 5 bbl. an hour from casing perforations at 3,360-70 ft. Top of the Lansing is 3,310 ft. (—1,224 ft.). Arbuckle was topped at 3,576 ft. (—1,490 ft.) and drilled to 3,596 ft., with 5-in. casing at 3,583 ft.

Darby and Bothwell 1 Giebler, NE NE SE 10-13-17, ½ mile south and east of the Catherine pool, also in Ellis County, is estimated good for 600 to 700 bbl. per day from the Arbuckle, topped at 3,516 ft. (—1,508 ft.). Casing was run to the top of the Arbuckle and the hole drilled to 3,542 ft. for the completion. Good showings also were found in the Lansing, topped at 3,262 ft. (—1,254 ft.), where in a drill-stem test at 3,324-34 ft., with tool open 10 minutes, 100 ft. of heavily oil and gas-cut mud was recovered. With a dry hole between it and production in the Catherine pool, the new well may indicate another pool.

Anderson-Prichard Oil Corp. 1 Ringwald, NE SE NE 32-18-10, northwestern Rice County, previously reported as having good saturation in both the Topeka and the Lansing, has been drilled to 3,090 ft. in the Quartzite, topped at 3,072 ft. (—1,324 ft.) and looks like a new pool opener in this pay. Shot with 10 qt. at 3,080-90 ft., it swabbed 62 bbl. of oil in 15 hours. The same zone then was treated with 500 gal. of acid, and the well now is making about 2 bbl. an hour. Location is 1½ miles south of the North Orth pool and about 2 miles southwest of the Orth pool, both of which are producing from the Lansing. Depth of this formation in the Ringwald well is about level with that in the Orth and North Orth pools.

A mile east of the Wekeeney pool in Trego County, Heller and B & R 1 Carpenter, SE SE SW 13-11-23, swabbed 40 bbl. of oil and 10 bbl. of water in 12 hours from the Lansing. Lansing was topped at 3,524 ft. (—2,271 ft.), and casing, run to 3,700 ft., was perforated at 3,606-19 ft. Arbuckle, topped at 4,007 ft. and drilled to 4,050 ft., was dry.

Farrell Drilling Co. 1 Rous, SW SW SE 31-16-10, Ellsworth County, swabbed 3½ bbl. of oil per hour from the Arbuckle, topped at 3,389 ft. (—1,468 ft.). Casing was run to 3,390 ft. and hole drilled to 3,394 ft. Location is 1 mile east of the Kraft-Prusa pool in Barton County, and 1½ miles south of the Bloomer pool.

KANSAS WILDCAT FAILURES

Barton County: Hinkle Oil Co. 1 Bahr, NW NE SW 32-17s-14w, dry, TD 3,458 ft., anhydrite 885 ft., Heebner 3,088 ft., Toronto 3,102 ft., Lansing 3,160 ft., conglomerate 3,390 ft., Arbuckle 3,432 ft.

Chase County: Amerada Petroleum Co. 1 Childs, NE NW NW 24-19s-7e, dry, TD 1,918 ft., no tops reported, strat test.

Ellis County: Deep Rock and Rine Drilling Co. 1 Binder, NW NW SW 15-14s-18w, dry, TD 3,670 ft., anhydrite 1,202 ft., Heebner 3,245 ft., Lansing 3,292 ft., conglomerate 3,570 ft., Arbuckle 3,640 ft.

Pratt County: White Eagle Oil Co. 1 Warren, SE SE SW 35-27s-13w, dry, TD 4,492 ft., Heebner 3,567 ft., lime 3,760 ft., Lansing 3,775 ft., basal Kansas iCty, 4,074 ft., Mississippian 4,212 ft., Kinderhook 4,231 ft., Viola 4,257 ft., Simpson shale 4,313 ft., Simpson sand 4,322 ft., Arbuckle 4,438 ft.

Rooks County: Peel & Hardman et al 1 Mongeau, NW NW SW 21-9s-19w, dry, TD 3,661 ft., Heebner 3,289 ft., Lansing 3,325 ft., Arbuckle 3,631 ft.

Heathman & Honaker 1 C. Hilgers, SW SE NE 22-9s-18w, dry, TD 3,417 ft., anhydrite 1,485 ft., Topeka 3,086 ft. Heebner 3,298 ft., Lansing 3,338 ft.

Stafford County: Helmerich & Payne 1 Ellis, SW SW SE 31-24s-13w, dry, TD 4,300 ft., Heebner 3,495 ft., Toronto 3,514 ft., lime 3,639 ft., Lansing 3,665 ft., conglomerate 3,990 ft., Mississippian 4,030 ft., Kinderhook 4,040 ft., Viola 4,100 ft., Simpson 4,230 ft., Arbuckle 4,263 ft.

MISSIOURI WILDCAT FAILURE

Carroll County: McVicker et al 1 Rimer, SW SE SE 9-52n-22w, dry, TD 325 ft., Pennsylvanian 150 ft., Warsaw 210 ft., Burlington 325 ft. (Previously completed).

NEBRASKA WILDCAT FAILURES

Dakota County: Peder Skriver 1 Roy Armour, C NW NE 33-28n-8e, dry, TD 1,250 ft., no tops reported.

Dawes County: White River Oil Co. of Nebraska 1 C. Saust, C SE SW 30-35n-47w, dry, TD 1,930 ft., Carlile 65 ft., Greenhorn 330 ft., Dakota 1,140 ft., Morrison 1,510 ft., Sundance 1,650 ft., Spearfish 1,895 ft.

Morrill County: W. C. Emrich Co. 1 Nerud, C SE SE 21-19n-51w, dry, TD 4,275 ft., Dakota 4,235 ft.

Red Willow County: Earl E. Evans 1 Wilcox, SW SW SE 32-3n-29w, dry, TD 2,183 ft., basal Fort Haynes 798 ft., Greenhorn 982 ft., basal Greenhorn 1,014 ft., Morrison shale 1,737 ft., Morrison

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sand 1,893 ft., Permian 1,973 ft., St. Corral 2,172 ft.

Scotts Bluff County: Baxter Drilling Co. 1 Kingree, SW SW NE 5-21n-54w, dry, TD 5,304 ft., Muddy sand 4,700 ft.

Sioux County: Felmont Corp. 1 Kinion, C SE NE 21-27n-55w, dry, TD 6,503 ft.

MICHIGAN

Quiet Week Recorded, With Only Two Wildcats

MOUNT PLEASANT.—Only two wildcats, both dry, were completed in Michigan during the current period. One of these wildcat tests was finished in the Dundee in Golden Township, Oceana County, while the other was a wildcat failure drilled to the Traverse lime objective in Jamestown Township, Ottawa County. The week is being recorded as one of the slowest in 1949 for Michigan.

However, at least one closely watched Basin area wildcat well was being drilled near the Dundee objective. Pure Oil Co. 1 Smith, NW NW NE 10-15n-8w, Martiny Township, Mecosta County, was being drilled below 3,522 ft., approximately 150 ft. off Dundee objective this week. Test was reported to be checking in structurally higher than most control points and was given a better than average chance by many geologists, provided intervals hold.

Another interesting exploratory test, Gordon Oil Co. 1 Fagan, NE NE SW 28-20n-17w, Grant Township, Mason County, was being respudded with rotary tools this week after first hole was lost in the Traverse at a total depth of 1,441 ft. Well will be drilled to the top of the Dundee where 7-in. casing will be set with rotary rig before standardization and completion with cable toops in the Dundee and Monroe horizons. The wildcat, second to be drilled in the district during the past 8 months, is reported to be located on a Superior Oil Co. core-drill high.

Merrill Drilling Co. 2 Sheahan, NW SW SW 7-15n-4w, Isabella field, Isabella County, was bottomed out in flowing production in the Dundee at a total depth of 3,781 ft. The well, the fifth flowing producer in the pool, was rated good for 6 bbl. an hour natural through a restricted choke. It is the diagonal northwest 20-acre offset to the field discovery well, and the direct east 10-acre offset to a previously drilled wildcat which was completed dry in the Dundee although it did show an encouraging oil section in the objective horizon.

MICHIGAN WILDCAT FAILURES

Oceana County, Golden Township: Basin Oil Co. 1 Stalker, NE SE NW 28-15n-18w, Dundee 2,142 ft., dry, TD 2,158 ft.

Ottawa County, Jamestown Township: Hugh H. Heinig 2 Holleman, W½ NE NW 23-5n-13w, Traverse 1,840 ft., dry, TD 1,842 ft.

LA.-ARK.

Bethany Test Flows Oil and Water

SHREVEPORT.—On the east edge of Bethany gas field, Caddo Parish, C. H. Murphy, Jr., 1 W. C. Agurs, NW NW 7-16n-16w, was flowing oil and water. The well, which is carried on field reports as a wildcat, was abandoned 2 years ago at 6,503 ft., in the Travis Peak. When reworking operations began, it showed for nearly 1,000,000 cu. ft. of gas around 6,000 ft. Plug was set to 4,957 ft., and perforations made from 4,932-38 and 4,942-56 tt. A drill-stem test, after acidizing, produced a flow of 98 bbl. in 8 hours, estimated at 15 bbl. of oil and the remainder salt water. Tubing pressure was 110 psi., with gas-oil ratio at 600 cu. ft. Perforations were squeezed and new holes made from 4,930-38 ft. A test was to be made with packer at 4,897 ft.

Phillips Petroleum Co. 1 Ellerbe, 17-15n-12w, was drilling ahead below 8,894 ft. in the Cotton Valley. Operations over the past several weeks were delayed by fishing jobs and repairs.

Catahoula Parish.—Hunt Oil Co. 5 Louisiana Delta, 23-4n-5e, swabbed salt water with a slight show of oil and gas from new holes at 5,834-40 ft., then squeezed. It was drilled out to 5,850 ft., where it swabbed 4 bbl. of oil an hour. At last report operators were waiting on standard rig.

Claiborne Parish.—Hunt Oil Co. 1 Owens, 19-23n-6w, was drilling below 7,371 ft. According to field reports it was still in the Travis Peak.

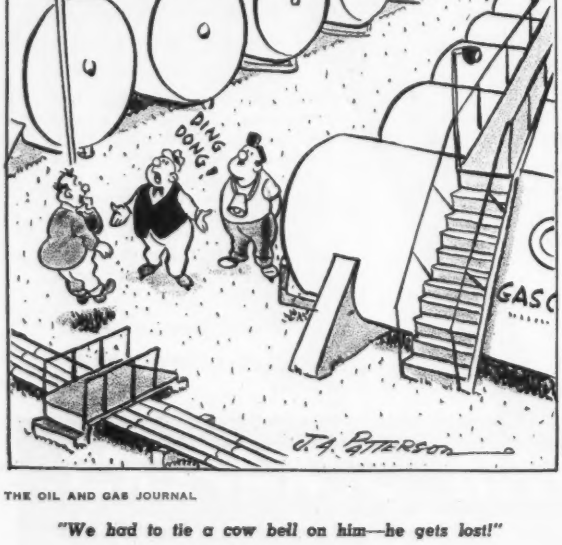
Southwest of Sugar Creek field, C. R. Schuster 1 Dance, 20-19n-6w, was drilling in the Lower Glen Rose at 6,010 ft.

Lincoln Parish.—Higo-Knowles field gained a new producing zone in the Cotton Valley formation at The California Co. 1 W. V. McFearin "Unit V-7," 22-10n-4w. Perforations were made at 8,908-20 ft., in a stray sand below the Vaughn, which was called the McFearin sand. On a 4½-hour test, the well flowed at the rate of 3,000,000 cu. ft. of gas a day plus 300 bbl. of distillate, through ⅝-in. tubing choke. Tubing pressure was 525 psi. Both the Bodcat, at 8,570 ft. and the Vaughn at 8,684 ft., had salt water. Total depth was 9,150 ft.

Ouachita Parish.—The California Co. 1 Brown Paper Mill, 10-16n-3e, was coring below 10,328 ft. in the Cotton Valley, with no shows. Electric log tops were: "D" sand 9,670 ft., Bodcaw 9,770 ft., and the Vaughn 9,970 ft.

NORTH LOUISIANA WILDCAT FAILURE

Bossier Parish: M. T. Halbouty 1 M. L. Goodwin, 12-22n-14w, dry, TD 3,337 ft., Nacatoch 1,606 ft., Saratoga 2,024 ft., Buckrange sand 2,496 ft., Tokio 2,733 ft., Tuscaloosa 3,132 ft., elev. 255 ft.



THE OIL AND GAS JOURNAL

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Feature of the Week
WHEN IT COMES TO PIPE LINES COME TO WHEATLEY'S
When It Comes to Pumps, Come to Wheatley
Frank Wheatley Pump & Valve Mfr.
Hale Station, Sand Springs Road, Tulsa, Oklahoma

ARKANSAS SUCCESSFUL WILDCAT

Union County: MacMillan Petroleum Corp. 1 C. Nash, SE NW 35-18s-15w, flowed 144 bbl. of 41°-gravity oil per day, through 10/64-in. choke, from Smackover at 7,769-72 ft., flowing TD 1,075 psi., GOR 560, TD 8,010 ft., PB 7,812 ft.

ARKANSAS WILDCAT FAILURES

Calhoun County: Crown Central Petroleum Co. 1 Southern, SE NE SE 9-14s-13w, dry, TD 3,622 ft.

Ouachita County: Carter Oil Co. 1 Lee Robertson, NE SE 31-14s-18w, dry, TD 2,800 ft., core test.

ILLINOIS

Richland County Gets New Production

MATTOON.—The area just east of the Noble section of Clay City-Noble Consolidated has a good prospective Rosiclare producer at Louis Jordan et al 1 Levitt, NW NW NE 22-3n-9e, Richland County, where operator is rigging up cable tools to test the probable pay at 3,009-12 ft. and 3,014-18 ft. Casing was set at 3,000 ft. following a drill-stem test at 3,003-20 ft. that had gas in 6 minutes and recovered 1,650 ft. of oil with no water. Bottom-hole pressure was 650 psi. Schulman Brothers and W. W. Toler have started new wells in the section.

About 6 miles to the east of the Levitt well and about 2 miles south of Olney, Don Baines el al 1 Charles Schonert, SE SE NW 16-3n-10e, has been completed in the Rosiclare at 3,080-3,103 ft. with an initial production of 20 bbl. per day.

Wayne County has what looks to be a new McClosky area north of Fairfield pool. Robinson & Puckett 1 J. C. Meyer, NW NW SE 3-2s-8e, is cleaning out to test pay at 3,370-76 ft. A 1-hour drill-stem test at 3,366-77 ft. had gas in 12 minutes and recovered 430 ft. of clean oil, 180 ft. of mud-cut oil, and 150 ft. of oil-cut mud. The well is about 3 miles east of Fairfield.

Robinson & Puckett 1 Johnson, NE NE SW 9-2s-8e, is getting Aux Vases production on the edge of Fairfield pool nearest the Meyer well. A 1-hour drill-stem test at 3,135-60 ft. recovered 450 ft. of oil and 350 ft. of mud-cut oil.

In Jasper County, J. B. Murvin and J. J. Lynn have set casing for a test of the Rosiclare at 1 H. O. Harding, NE SE SE 11-5n-10e, after a 2-hour drill-stem test at 2,883-2,966 ft. had a recovery of 1,400 ft. of gas and 150 ft. of oil-cut mud. This well is west of the McClosky extension to Ste. Marie pool, completed in February.

J. L. Crawford has three wells in 6-8s-10e, Gallatin County, that are nearing the completion stage. The wells, Crawford 1 Wilson, SE SE NW; Crawford 1 Sutton, SW SW NE; and Crawford 2 Sutton, SE SW NE are being drilled as tight holes but current local reports indicate that all three may produce commercially from the Tar Springs.

ILLINOIS SUCCESSFUL WILDCAT

Richland County: Don Baines 1 C. Schonert, SE SE NW 16-3n-10e, IP 20 bbl., Rosiclare, through perforations at 3,080-86 ft., 3,087-90., and 3,093-3,103 ft., TD 3,158 ft.

ILLINOIS WILDCAT FAILURES

Bond County: Joe Kesl, Jr., 2 Dank Brothers Coal & Coke Co., NE SW NE 17-5n-4w, dry, TD 762 ft.

Christian County: T. M. Pruett 1 Stalte, SW NW SW 33-11n-14w, dry, TD 2,636 ft.

Crawford County: H. R. Purcell et al 1 C. Payne, NW NW SW 11-8n-14w, dry, TD 1,017 ft.

Lawrence County: W. W. Toler 1 J. L. Smysor, NW NW NW 2-3n-11w, dry, TD 1,886 ft.

Macon County: F. S. Runyon 1 M. V. Porter, SW SE SW 17-14n-2e, dry, TD 2,420 ft.

4 reasons why

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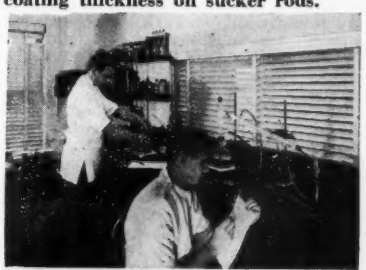

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Shelby County, M. H. Richardson et al 1 H. Moore, SE NE SE 4-12n-3e, dry, TD 1,834 ft.

Wabash County: Aurora Gasoline Co. and N. V. Duncan 1 Stoltz, SW SE NE 29-1n-13w, dry, TD 2,795 ft.

PERMIAN BASIN

North Synder Area Gets New Play

MIDLAND.—Scurry County chalked up another Canyon limestone discovery, or far extension to North Synder field this week, as Ryan, Hays & Burke 1 R. B. Brown, 660 ft. from north and west lines, Tract 8, Section 20, J. P. Smith Survey, flowed oil on two drill-stem tests of the lime. Estimates on its probable initial potential have ranged as high as 90 bbl. of oil an hour, while estimates on the oil flow during the two tests have been from 15-25 bbl. of oil an hour.

The well topped the Canyon reef lime at 6,530 ft., drilled ahead to 6,594 ft., then ran a 15-minute test with packer at 6,450 ft. Gas came to the surface in 3 minutes, drilling mud in 8 minutes, and oil spraying over a considerable area in 10 minutes. The flow was shut in after 12 minutes and no official estimate or gage was reported.

The second test was run from 6,593-6,644 ft., with packer set at 6,532 ft. and the tool open 2 hours and 25 minutes. Flowing through ¼-in. choke, gas came to the top in 2½ minutes, drilling mud in 47 minutes, and oil in 53 minutes. According to one report, the well flowed into tanks for 1 hour, with a recovery of 16 bbl. of 42°-gravity oil, and no water. Gas-oil ratio was around 575 cu. ft. Casing was set to 6,535 ft. for production tests.

Location of the new well is about 3 miles south and slightly west of wells in the main section of North Snyder field. It is said to be about 50 ft. low to the nearest wells in that field. It was also estimated to be some 350-400 ft. above the North Snyder water table. The 1 R. B. Brown is about 4 miles west of Placid Oil Co. 1 W. W. Early, Strawn discovery which completed this week for 291 bbl. of oil daily from 7,520-45 ft.

According to field reports, Ryan, Hays & Burke, of San Antonio, own a half interest in the well and block, while Sunray Oil Co. owns one-quarter, and Chicago interests own one-quarter. Companies preparing to drill immediate offsets were: Pure Oil Co., a northwest offset, in Tract 9 of Section 20; Tide Water Associated Oil Co., a north offset; Barnsdall Oil Co., a west offset. Rig from the 1 Brown was skidded 1,320 ft. south for the 2 Brown.

Lone Star Producing Co. 1 M. M. Maule, SE SE 451-97-H&TC, recovered 15 ft. of slightly salt-cut mud on a 1-hour drill-stem test from 8,036-77 ft. A test from 8,091-8,115 ft., on which time was not reported, recovered 1 stand of clear water and 24 stands of water cushion cut with oil. Drilling continued below 8,131 ft. Top of the Mississippian was reported at 7,951 ft.

Standard Oil Co. of Texas 3-4 Brown, southernmost well in North Snyder field, SE SW of Section 440, completed for a flowing potential of 438 bbl. of oil, through 14/64-in. choke, from open hole. Total depth was 6,829 ft. Flowing pressure was 1,085 psi. on tubing.

Upton County.—The southeastern portion of the Benedum multiple-pay field had prospects of another Pennsylvanian Bend well at Plymouth Oil Co. 1-50 Eliott, NW NW 50-Y-TCRR. A 1-hour drill-stem test from 10,567-10,628 ft. brought gas to the top in 27 minutes, and recovered the 1,000-ft. water blanket cut with oil and gas, plus 700 ft. of oil and gas-cut mud. Drilling continued below 10,648 ft. Location is a southwest offset to the same company's 1-46 Elliott (Regan County), Bend discovery for the field.

WEST TEXAS (DISTRICTS 8 & 7-C) SUCCESSFUL WILDCATS

Midland County: The Texas Co. 1 Clarence Scharbauer, SW SW 20-40-T2S-T&P, 1 mi. S Warfield, flowed 38½ bbl. 46.9°-gravity oil, plus 5 bbl. water in 24 hr., 5/8-in. choke, Ellenburger 13,049-150 ft., GOR 675 cu. ft., TP 575-200 psi., CP 1,700 psi., Pennsylvanian 9,800 ft., Si-

(Continued on page 189)

OHIO, KENTUCKY

Stark County Gas Pool Proves Fairly Consistent

COLUMBUS.—The new gas pool in southeastern Bethlehem Township, Stark County, has proved fairly consistent with only one dry hole so far. A ½-mile west extension was drilled in by M. B. Belden on F. & M. Farmer, Section 15, with a natural open flow of 1,500,000 cu. ft. from the red and white Clintons at 4,397-4,458 ft. The well is now shut in on the casing and may be shot.

B. H. Putnam's latest test to develop a gas pool at Reedsville in Olive Township, Meigs County, the 1 W. A. Wiley, Section 9, drilled the Berea sand at 2,102-05 ft. with 45,000 cu. ft. natural. After 133 and 2,333-lb. shots, the well gaged 700,000 cu. ft. with a rock of 810 lb.

Shuff & Bucy have moved 1½ miles west of the rich Bladensburg pool for a test on G. I. Elliott in Lot 3, Clay Township, Knox County. Six wells are drilling in the pool itself, and one in the south part of the Township.

The Perryton extension in Jackson Township, Muskingum County, will probably cover more area than Bladensburg pool and is getting an equally good play. Six wells are drilling and a number of locations are waiting for tools.

Some increase in drilling is noted with 17 locations for the week from 11 counties. Ashland with three locations was followed by Knox, Muskingum, Guernsey, and Noble with two each. Cambridge field led with 6 completions out of a total of 20.

WESTERN KENTUCKY

OWENSBORO. — The outstanding McClosky well in South Morganfield pool has been completed. Sun Oil Co. 11 Lilly Binford, SE SW SE 23-O-19, Union County, flowed 327 bbl. per day from the McClosky at 2,576-2,606 ft. Sun opened the pool in March of last year and did most of the development drilling. Most of the wells are completed either in the Pennsylvanian or Waltersburg, upper Mississippian.

Gilliam Drilling Co. has completed 1 Gregory, 15-P-28, with initial production of 20 bbl. per day from the Palestine at 1,037-43 ft. The well is between Griffiths pool and Birk City field.

North Euterpe pool in Henderson County, opened last November, has another producer with the completion of Ashland Oil & Refining Co. and Basin Drilling Co. 6 Crafton, 10-O-25. The well made 40 bbl. per day from the Hardinsburg at 1,705-25 ft.

In the Pettit area of Daviess County, J. C. Ellis 4 Fulkerson, 4-N-29, is cleaning out for tests of the Tar Springs after shooting pay at 1,170-1,200 ft. and at 1,210-20 ft.

WESTERN KENTUCKY WILDCAT FAILURE

Daviess County: George S. Engle et al 1 James Grant, C E½ NE SE 9-O-27, dry, TD 2,236 ft.

EASTERN KENTUCKY

ASHLAND.—In Furnace gas field the biggest news of the week was the reported show of gas from the Knox dolomite in A. H. Carpenter 3A Garret, 22-P-68, Estill County. Gaging nearly 3,000,000 cu. ft. per day from the overlying St. Peter sand, the test was taken on down into the Knox after shutting off St. Peter gas with plastic. Knox gas is supposed to have gaged 1,150,000 cu. ft.; data as to what portion of the Knox was productive is not as yet available. Previously St. Peter had been topped at 2,560 ft.

A 1-mile northeast outpost test to the above pool is now drilling. The test is Raydure Partnership 1 Herman Bellamy, 16-P-67, Powell County. Seeking gas in the St. Peter sand or Knox dolomite, the well was drilling below the 2,100-ft. level as of last week.

In Johnson County, 19-R-79, Ashland Oil & Refining Co. 8 Wallace Williams was shut down for repairs at 4,318 ft. with drilling expected to be resumed shortly.

INDIANA

EVANSVILLE.—Interest continues in Devonian production in Sullivan and Vigo counties as F. B. Cline completes 2 wells in the rapidly developing area between Shelburn and Marts pools in Sullivan County. The best well to date was Cline 1 Mable Marts, NW SW NW 20-9n-9w, completed last week with an initial production of 448 bbl. per day through ½-in. choke. Production is from the Devonian at 2,135-65 ft. Cline 1 Paul Bradbury, NW SE NW in the same section, was completed for 265 bbl. per day from pay at 2,142-67 ft.

A. S. Reed is testing a well in the same section. The well, Reed 1 Dolph Sluder, SW NW NW, flowed at the rate of 450 bbl. per day through ½-in. choke from pay at 2,116-62 ft. Reed announced locations for two more wells bringing total operations in Sections 19 and 20 to eight.

In Posey County, A. J. Slagter, Jr., has set casing to test the Cypress at 1 Elizabeth Utley, NW SW NE 26-6s-13w, about 1 mile southeast of the town of Bufkin.

North Owensville pool in Gibson County is getting another good McClosky well on the south edge of the pool. Ashland Oil & Refining Co. et al 1 P. Brazelton, SE SW SW 30-2s-11w, had gas in 3 minutes and flowed oil in 48 minutes on a 1-hour drill-stem test of the McClosky at 2,299-2,305 ft. Operators are rigging up rotary at 2 Brazelton, a west offset. To the south, Evans & Dobbs Drilling Co. completed 1 C. Moore, NW SW NE 31-2s-12w, making 150 bbl. per day from the McClosky and are preparing to test at 2 Nancy Marvel, NW NW NW of the same section. Same operators are rigging up at 1 John Robb which is 1 location west of 2 Marvel. Evans & Dobbs recently completed 1 Nancy Marvel, NE NW NW of Section 31, for 125 bbl. per day from the Cypress at 2,016-26 ft. and tests at 1 Marvel will also be in the Cypress.

INDIANA SUCCESSFUL WILDCAT

Posey County: Joe Vail 2 W. E. Hill, SW SW SW 18-7s-12w, IP 62 bbl., Tar Springs, 1,932-42 ft., TD 1,945 ft. (Extension to Lamott pool).

INDIANA WILDCAT FAILURES

Dubois County: Arthur Grewe 1 G. P. Berg, SE SE NE 9-3s-4w, dry, TD 302 ft.

Gibson County: White River Drilling Co. 1 Paul R. Kendle, SE NW SW 34-1s-10w, dry, TD 1,884 ft.

R. Ryan and O. D. Sharp 1 Hull, SW SW NW 17-2s-12w, dry, TD 2,663 ft.

Huntington County: V. & S. Oil Co. 1 Raymond Brane, SE SW SE 7-20n-10e, dry, TD 1,023 ft.

Jackson County: H. R. Burton 1 Hunsucker, NW NE NW 21-6n-4e, dry, TD 495 ft.

Posey County: First National Petroleum Trust Co. 1 M. Robb, SE SW SW 17-4s-13w, dry, TD 3,016 ft.

Ashland Oil & Refining Co. et al 1 Schroder, NW NW NE 32-5s-12w, dry, TD 2,840 ft.

George & Wrather Drilling Co. 1 Herb F. Clements, NE NE NW 33-5s-13w, dry, TD 3,056 ft.

Vanderburgh County: Walter Duncan and Calvert & Willis 1 F. M. Condit, SE NE SE 4-7s-11w, dry, TD 2,599 ft.

Wabash County: Mid-West Drilling Co. 1 Whitesel, SW NE NW 12-26n-5e, dry, 996 ft.

Two-Thirds of First-Quarter Completions Successful in Finding Oil or Gas

by Polly De Armond

DURING the first quarter of this year there were 8,612 new wells completed, of which almost two-thirds were successful in the search for oil or gas. This total is a gain of 216 completions, or 2.6 per cent, over the same period of last year. Footage drilled in 1949 totaled 31,672,802 ft., an increase of 2,166,549 ft., or 7.3 per cent over the first quarter of 1948.

Average depth of completions was 3,701 ft. as against 3,502 ft. in 1948. Every depth classification except that of "less than 2,500 ft." showed gains: the "2,500-5,000-ft." class was up 130 wells, "5,000-7,500-ft." wells rose 97, the "7,500-10,000-ft." division increased 90 wells, and the "over 10,000-ft." group gained 36 wells.

First Quarter vs. Entire Year

Completions during the first quarter of any year generally average 21.6 per cent of the annual tabulation, while footage is usually 22.3 per cent of the year's total. If these ratios are used to arrive at estimated annual totals for 1949, approximately 39,870 wells will be completed and 142,031,000 ft. drilled. This would be 2,320 wells and 4,499,000 ft. more than estimated the first of the year. *(See The Oil and Gas Journal, January 27, page 170.)* Economic trends may indicate that the first-quarter completions will represent a slightly higher than average percentage of the total year.

Sectional Increases

The Texas - New Mexico - Arizona area recorded the greatest gains over the comparative 3-month period of the preceding year. Completions were up 472 wells, or 17.1 per cent, and footage climbed 1,936,849 ft., or 15.9 per cent. The southern states of Louisiana, Arkansas, Mississippi, Alabama, Florida, Georgia, and Tennessee noted a gain of 34 completions (5.4 per cent) with an increase of 519,522 ft. (15.5 per cent) in total depth drilled.

For 1949, the North Central section (Ohio, Indiana, Kentucky, Illinois, and Michigan) reported the following gains: 88, or 6.7 per cent more wells, and 149,986 ft., or 4.8 per cent additional footage. An analysis of figures for the Pacific Coast show that wells in that area were carried to greater depths this year, as number of completions fell 7.1 per cent while footage increased 5.3 per cent.

Decreases by Areas

The Mid-Continent division, including Oklahoma, Kansas, and Nebraska, although down 5.7 per cent in wells, dropped only 1 per cent in footage. The Rocky Mountain region, made up of Montana, Wyoming, Colorado, and Utah, declined 8.8 per cent in completions and 15 per cent in footage.

The Eastern district of New York, Pennsylvania, and West Virginia declined 18.2 per cent in wells and 17.7 per cent in footage, compared with results for the same months of last year.

SUMMARY OF COMPLETIONS, MARCH 1949

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Rigs and drilling
New York	71	36	0	35	71	0	0	0	0	0	103,328	131
Pennsylvania	162	80	13	69	157	4	1	0	0	0	269,983	266
West Virginia	46	9	35	2	19	26	1	0	0	0	130,400	167
Ohio	89	34	23	42	40	47	2	0	0	0	217,239	139
Indiana	93	36	2	55	75	18	0	0	0	0	171,815	112
Kentucky	74	25	25	24	52	21	1	0	0	0	163,500	37
Illinois	142	79	0	63	46	96	0	0	0	0	367,341	227
Michigan	52	20	1	31	35	17	0	0	0	0	110,574	100
Kansas	205	108	10	87	23	181	1	0	0	0	665,661	386
Neb., Mo., Iowa	1	0	0	1	0	1	0	0	0	0	2,525	15
Oklahoma	320	189	17	114	104	143	54	12	7	0	1,158,467	669
Texas	1,256	771	67	418	299	534	276	114	30	3	5,461,277	1,449
North	232	136	0	96	113	83	35	1	0	0	675,382	177
West Central	198	99	5	94	62	127	9	0	0	0	585,475	135
West	281	253	0	28	30	133	70	34	12	2	1,476,600	529
Panhandle	75	51	21	3	3	72	0	0	0	0	229,260	109
Eastern	73	42	11	20	2	33	24	12	1	1	419,899	87
Gulf Coast	174	87	14	73	21	30	63	48	12	0	1,087,137	251
Southwest	223	103	16	104	68	56	75	19	5	0	987,524	161
Louisiana	167	113	12	42	54	19	24	38	28	4	992,096	238
Northern	77	52	11	14	50	8	10	5	4	0	254,488	69
Southern	90	61	1	28	4	11	14	33	24	4	737,608	169
Arkansas	29	16	0	13	10	11	4	4	0	0	117,842	28
Mississippi	31	14	0	17	0	4	12	7	8	0	235,852	39
Ala., Ga., Fla.	8	1	0	7	1	2	2	1	2	0	49,323	7
Tennessee	4	1	0	3	4	0	0	0	0	0	4,015	7
Montana	16	11	0	5	10	4	1	1	0	0	32,122	91
Wyoming	47	28	1	18	5	23	4	7	3	5	256,851	170
Colorado-Utah	6	3	0	3	1	3	2	0	0	0	26,703	67
New Mexico	§44	34	3	§7	4	§28	9	4	1	0	198,225	146
California	213	173	2	38	54	91	35	20	9	4	883,440	276
Total March 1949	3,076	†1,771	211	*1,094	1,064	1,271	429	208	88	16	11,618,579	‡4,767
Total February 1949	2,437	1,397	170	870	878	1,031	307	161	54	6	8,869,755	4,348
Total March 1948	2,796	1,665	215	916	1,153	1,070	322	164	87		9,767,073	4,423
Cumulative 1949	8,612	4,905	581	3,126	3,130	3,552	1,124	551	225	30	31,672,802	....
Cumulative 1948	8,396	4,869	663	2,864	3,267	3,422	1,027	461	219		29,506,253	....

*Incl. 115 service wells: N. Y. 35, Pa., 66, Ohio 5, Ky. 1, Kans. 1, Okla. 2, No. Tex. 3, E. Tex. 2. † Incl. 32 distillate wells: Okla. 3, E. Tex. 4, Tex. Gulf 5, S.W. Tex. 2, No. La. 7, So. La. 9, Miss. 2. ‡Incl. all wells rigged up and/or drilling at end of month. §Incl. 1 Arizona completions.

STATISTICS and

WEEKLY WELL COMPLETIONS . . . . WEEK ENDED APRIL 23, 1949

	Total of all wells					16 wk.		Wildcat completions and discoveries					Cumulative total, 1949				
	Comp.	Oil	Gas	Dry	Footage	1949	1948	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	26	12	0	*14	27,300	377	456	0	0	0	0	0	0	0	0	0	0
Pennsylvania	36	16	2	†18	53,014	555	819	0	0	0	0	0	0	0	1	1	2
West Virginia	6	1	4	1	16,917	157	225	0	0	0	0	0	0	0	4	4	8
Ohio	18	7	4	7	43,808	330	359	0	0	0	0	0	1	0	2	14	17
Indiana	27	8	1	18	51,450	317	275	1	0	0	10	11	4	0	0	70	74
Kentucky	14	8	3	3	24,291	253	177	0	0	0	1	1	4	0	0	13	17
Illinois	31	18	0	13	81,058	583	529	1	0	0	8	9	9	0	0	98	107
Michigan	16	10	0	6	35,068	277	176	0	0	0	2	2	12	0	1	100	113
Kansas	56	28	0	‡28	178,879	861	745	0	0	0	7	7	17	0	2	103	122
Neb., Mo., Iowa	9	0	2	7	22,796	10	0	0	0	0	7	7	0	0	0	8	8
Oklahoma	92	59	9	24	288,749	1,158	1,101	3	0	0	5	8	45	7	5	157	214
Texas	264	154	24	86	1,138,501	3,868	3,177	9	1	2	41	53	131	13	32	661	837
North Central (Dist. 7-B & 9)	97	48	4	§45	296,708	1,254	953	1	0	1	21	23	66	0	6	249	321
West (Dist. 7-C & 8)	59	54	0	5	322,616	855	861	3	0	0	1	4	15	0	0	55	70
Panhandle (Dist. 10)	25	6	17	2	83,798	328	167	1	0	0	0	1	1	0	0	1	2
Eastern (Dist. 5 & 6)	16	6	0	10	83,672	213	157	0	0	0	7	7	1	1	2	38	42
Gulf Coast (Dist. 2 & 3)	30	19	3	8	182,931	563	507	1	1	1	4	7	27	7	16	124	174
Southwest (Dist. 1 & 4)	37	21	0	16	168,776	655	532	3	0	0	8	11	21	5	8	194	228
Louisiana	46	34	4	8	212,017	610	540	1	0	1	3	5	15	4	1	56	76
Northern	28	21	3	4	75,121	313	350	0	0	0	1	1	1	0	0	25	26
Southern	18	13	1	4	136,896	297	190	1	0	1	2	4	14	4	1	31	50
Arkansas	9	4	0	5	35,346	85	86	1	0	0	2	3	3	0	0	20	23
Mississippi	8	2	0	6	40,673	109	111	0	0	0	5	5	2	0	1	30	33
Southeastern States	1	0	0	1	1,485	17	14	0	0	0	1	1	1	0	0	15	16
Montana	3	1	0	2	10,014	59	64	0	0	0	0	0	1	0	1	6	8
Wyoming	12	5	0	7	50,067	167	116	0	0	0	2	2	6	0	0	30	36
Colorado-Utah	0	0	0	0	0	35	75	0	0	0	0	0	1	0	0	13	14
New Mexico	15	9	3	3	76,753	166	187	0	0	0	1	1	2	0	0	14	16
California	55	42	0	13	177,359	813	820	0	0	0	9	9	15	0	2	140	157
Total United States	744	418	56	270	2,565,545	10,807	10,052	16	1	3	104	124	269	24	52	1,553	1,898
Total previous week	750	430	56	264	2,785,906	10,063	9,364	22	3	2	105	132	253	23	49	1,449	1,774
Total April 24, 1948	688	398	30	260	2,406,829			16	2	4	99	121	206	19	83	1,376	1,684

Service wells included: *14, †16, ‡2, §1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULE

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.96	....	....	....
19-19.9	2.07	....	....	....
20-20.9	2.17	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED APRIL 16

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	708	2,210	237	879	1,221	27,027	7,671	16,769	9,756
Appalachian:									
District 1	95	312	36	83	90	2,879	358	634	451
District 2	57	218	15	38	103	1,230	131	226	275
Ind., Ill., Ky.	846	3,006	375	755	1,061	28,798	2,662	7,308	4,837
Okla., Kans., Mo.	407	1,514	135	538	469	13,492	858	3,045	2,176
Inland Texas	210	818	66	149	325	5,044	377	623	969
Texas Gulf Coast	1,286	4,220	622	1,545	1,691	19,029	2,729	8,600	8,814
La. Gulf Coast	462	1,514	384	716	445	5,969	2,155	2,712	2,302
N. La. and Ark.	61	190	43	47	96	2,357	371	954	195
Rocky Mountain:									
New Mexico	13	53	..	12	27	78	25	35	39
Other Rocky Mtn.	154	440	35	208	277	3,863	218	1,107	792
California	844	2,424	117	1,013	2,477	16,156	632	7,156	29,182
April 16, 1949‡	5,143	16,919	2,065	5,983	8,282	125,922	18,187	49,169	59,788
April 9, 1949‡	5,067	17,176	2,040	6,410	7,954	127,522	17,878	48,920	58,510

*Finished and unfinished. †At refineries including natural blended. ‡Comparable data for 1948 on new basis not yet available.

Bureau of Mines crude-oil stocks 269,544,000 bbl. as of April 16—up 1,381,000 bbl. One year ago 228,728,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas†	$2.65
Kettleman Hills, California*	2.64
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.2
Bradford, Pennsylvania	2.4
Eastern Ill. and Western Ind.†	2.7
Tomball, Texas Gulf Coast	2.6

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	April 23 crude oil	B. of M. April demand	April 16 crude oil
Alabama	1,200	1,500	1,200
Arkansas	81,300	84,000	81,750
California	945,000	950,000	947,200
Colorado	62,500	53,000	61,800
Eastern	61,550	61,350	62,800
Florida	1,400	1,300	1,400
Illinois	174,400	165,000	175,300
Indiana	22,800	22,000	21,400
Kansas	296,600	290,000	299,700
Kentucky	23,400	21,000	23,000
Louisiana	494,100	478,000	495,000
North Louisiana	117,100	.....	118,000
South Louisiana	377,000	.....	377,000
Michigan	45,800	45,000	45,100
Mississippi	108,250	125,000	108,950
Montana	25,900	24,000	25,600
Nebraska	300	700	300
New Mexico	131,800	125,000	131,800
Oklahoma	408,800	415,000	400,650
Texas	1,911,300	2,370,000	1,911,300
Dist. 1 (Southwest)	25,210	.....	25,210
Dist. 2 (Southwest)	120,950	.....	120,950
Dist. 4 (Southwest)	185,250	.....	185,250
Dist. 3 (Gulf Coast)	363,115	.....	363,115
Dist. 5 (Eastern)	35,575	.....	35,575
Dist. 6 (Eastern)	84,550	.....	84,550
East Texas Field	253,600	.....	253,600
Dist. 7-C (West)	42,525	.....	42,525
Dist. 8 (West)	535,725	.....	535,725
Dist. 7-B (W. Central)	58,600	.....	58,600
Dist. 9 (N. Central)	118,500	.....	118,500
Dist. 10 (Panhandle)	87,700	.....	87,700
Utah	200	150	200
Wyoming	121,300	138,000	123,400
Total United States	*4,917,900	5,370,000	4,917,850

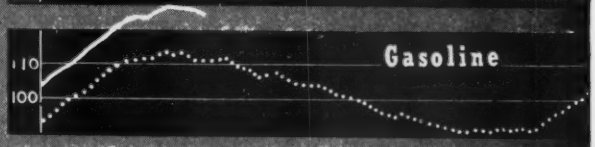
Change from prev. week, up 50

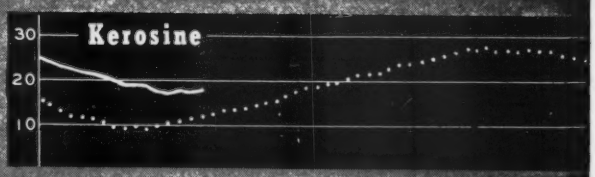
Total production January 1-April 23 ..... †599,580,720 bbl.

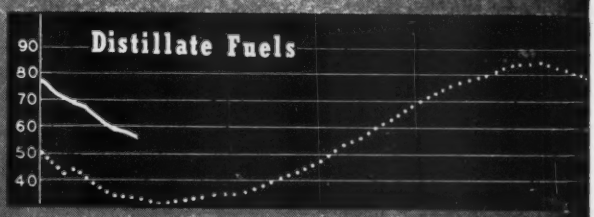
Same period last year (crude plus cond.) .. 617,628,235 bbl.

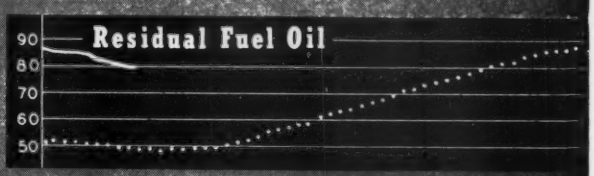
*Not incl. 86,510 bbl. condensate. †Incl. 9,608,315 bbl. condensate.

STOCKS IN UNITED STATES

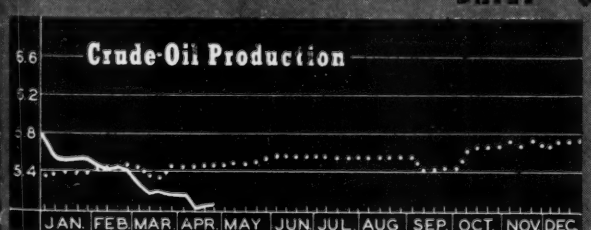


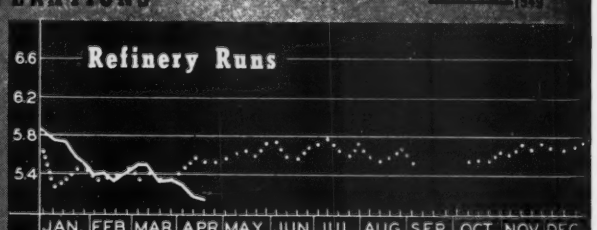




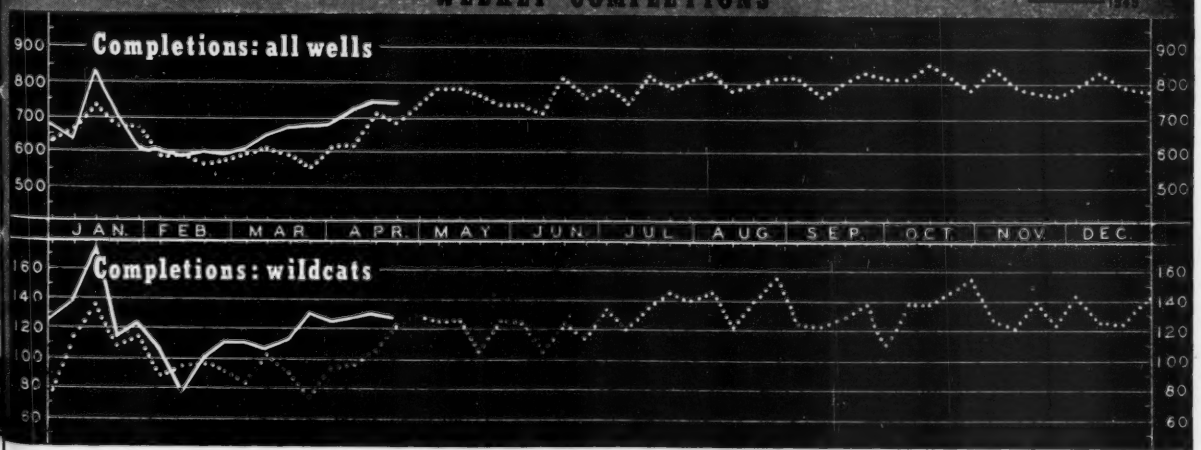


DAILY OPERATIONS





WEEKLY COMPLETIONS



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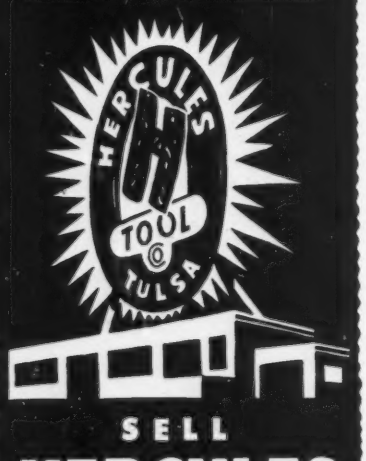

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MARKETS

PETROLEUM products markets last week were highlighted by high gasoline demands and still further losses by fuels. Refinery demand for gasoline (refinery production plus stock change) during the 7-week period ended April 16 was about 7 per cent above that of the same period in 1948. The 1,600,000-bbl. reduction in gasoline stocks during the last week of the period was the first major withdrawal of this season. More than 100,000 bbl. daily came from storage in the combined Gulf - East Coast districts, and about the same reduction was recorded for the inland areas.

Demands for both light and heavy fuels are running below last season's levels and stocks are beginning their seasonal climb. The demand for distillate fuel during the coming 6-week period will depend in a large measure on the stocking program by jobbers and other marketers. Last year, most distributors expected increases in fuel prices later in the season and as a result secondary storage was almost filled by the end of June. This withdrawal from primary storage gave a high calculated demand for the early summer months. If this year's stocking program does not follow the pattern of last season we will not be able to tell much about future distillate markets by a year-to-year comparison of distillate demands.

Mid-Continent Gasoline Strong

Demands for gasoline in the Mid-Continent continued high with shipments in some cases running higher than had been expected. Recycled regular - grade gasoline which was being offered at very low prices at the end of the winter has strengthened materially. Natural gasoline, grade 26-70, advanced ¼ cent for the Breckenridge area followed by the same increase for Group 3. Movements to refineries were reported to be good.

Spot sales of No. 2 distillate in the Mid-Continent area were down to "practically no movement," with offers below 7 cents.

New York Distillate Down

Light and heavy fuel-oil prices slipped back still further in the East last week. Esso Standard Oil Co., major marketer in a wide section of southeastern United States, reduced heating oils an average of about 0.4 cent at seaboard points from Virginia to New England and dropped its No. 6 posting 10 cents per barrel in New York Harbor.

New posted price for No. 2 oil in New York Harbor was brought to 7.4 cents. Other major suppliers were meeting the reduction but it is too early for evidence of stabilization at the new lower level. No. 6 was quoted at $1.75 New York Harbor barge.

Esso's announcement said the price changes are the result of "increased supplies and lower wholesale prices at the Gulf, the principal source of these products." Reductions at the retail level were expected as a result of the new terminal prices. Kerosine was not affected by the cuts and gasoline was reported firm.

Gulf Fuels Reduced

Esso also announced a reduction in No. 2 and No. 6 prices at Gulf Coast ports effective April 22. No. 2 was lowered ⅜ cent per gallon and No. 6 was reduced 10 cents per barrel.

Markets for distillate fuels continued weak and about the only trading activity centered around gasoline.

Humble Oil & Refining Co. announced a 25-cent reduction in the price of crude from Hawkins, Talco, and Sand Flats pools in northeastern Texas. The crude is low gravity.

Representative Quotations

Representative spot-market quotations of leading suppliers as of April 25, 1949. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Tex. Gulf Coast
Regular gasoline, 73-75 octane	9⅜-9⅝	11.5	9¼-10
Premium gasoline, 78-80 octane	10¼-10¾	12.5	10¼-11
42-44 w.w. kerosine	8-8½	8.3-9.3	7¾-8½
No. 2 straw fuel oil	6¾-7	7.2-7.4	6⅜-6½
No. 6 residual	$0.95-1.10	$1.65-1.75	$1.20-1.30

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5¼	4¾	5
Grade 18-55	6.3	5.7	6.0

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	11
750 vis., No. 3-4 neutral	14
2,000 No. 5-6 neutral	16-16.5

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	19
200 vis., No. 3 neutral, 0-10 pp.	16

Western Pennsylvania

144-155 vis. 10 p.t. bright stock	21.5-23.5
180 vis., 0 p.t. neutral	20.5-22.5

CRUDE-SCALE WAX
Mid-Continent

132-134 A.M.P.	5

New Sales Records Set By Richfield Oil Corp.

(Continued from page 82)

(24,854 bbl. daily average), as compared with a net production in 1947 of 9,485,000 bbl. (25,986 bbl. daily average). These figures do not reflect the increase to the company's production made possible by the Cuyama Valley discovery, as construction of pipe lines and tankage to handle the output there was not completed until the last 2 months of the year.

In addition to its own production, Richfield produced, under contract for the city of Long Beach, approximately 2,000,000 bbl. of crude oil. At year's end the company had completed 49 oil wells on this property, and was achieving a production of 8,300 bbl. of crude oil per day.

During 1948 Richfield also renewed its contract with the Union Pacific Railroad to purchase all crude oil produced from Union Pacific's properties in Wilmington field in the Los Angeles Basin.

Refinery throughput was greater than any prior year in the company's history, approximately 27,014,000 bbl. of crude oil. Crude oil processed in 1947 amounted to 25,734,000 bbl.

Net earnings per share of stock were $4.19 in 1948 as compared with net earnings per share of $2.96 in 1947.

N.G.A.A. Told of Big Future L.P.G. Demand

(Continued from page 67)

whole, results reported for the liquid hydrocarbon blend showed much less deviation than the results obtained in the earlier gas low-temperature fractional analysis program.

Plots given showed that in the fractionation of this type of liquid blend, a sample size of 5 to 10 ml. is sufficient and that there is no apparent advantage in taking longer than 4 to 8 hours to make an analysis. The conclusion made in the past gas-analysis project, that exact equipment standardization is not as important as "human element" factors, was again indicated. Good results were obtained with various types of equipment while there were other cases of poorer results on the same types of apparatus.

A second committee report was that presented by W. H. Stewart of Sun Oil Co., Beaumont, on "Cures for Corrosion in Gas Condensate Well." In reviewing the committee's work of the past year, Stewart said that definite progress had been made toward solving gas-condensate well corrosion. In this connection he pointed out that a survey made in March of this year showed there is a strong trend toward use of nickel-alloy tubing as a means of combating corrosion. Some 94 strings of nickel-alloy tubing are in process of installation with 48 strings reported complete and in operation, Stewart said.

"Although the present cost of alloy tubing is about three times that of standard steel tube, the more extended use of this product doubtless will influence this for the better. However, even at the higher initial cost it will prove good economy in the long run if it eliminates costly workovers and repairs. As yet sufficient time has not elapsed on present installations to justify positive conclusions," Stewart reported.

"In running the first few strings of this tubing much trouble was encountered with galling of threads. Various lubricants were tried and several strings were Parkerized in an effort to mitigate this trouble. These strings were run in several wells and this seemed to be the answer. However, a sizable number of strings with nontreated threads have been reported to have been run as many as 8½ round trips by simply using extreme care in handling such as spinning up by hand, careful cleaning of threads and lift plugs, and the elimination of 'jumping' the pins out of the boxes when coming out of the hole."

Regarding the use of inhibitors, Stewart said the committee did not have sufficient statistical data on effectiveness and costs to make any general comparisons from an economical standpoint.

Other committee reports given were "Tests for Determining the Liquid Content of Field Gases," by W. H. Vaughan of Tide Water Associated Oil Co., Houston; "Modifications in L.P.G. Testing Methods," by H. A. Montgomery of Warren Petroleum Corp., Houston, and chairman of the N.G.A.A. technical committee; and "Report of N.G.A.A. Proposal to A.S.T.M. for 15-lb. R.v.p. Winter Motor Fuel," by Kenneth Bottenberg of Phillips Petroleum Co.

At the "Information Please" session, questioning brought out the fact that much attention is being given the possibility of storing propane and butanes underground. Much weight was placed on the selection of the proper type reservoir, preferably an anticlinal structure in which there existed salt water, and in choosing the site of the injection well or wells. In regard to the well sites it was brought out that the most desirable location would be at the crest of the structure. Consideration also should be given to depth, it was brought out, and a careful study of the reservoir would be necessary.

Other topics covered included tank-cleaning methods, elimination of nitrogen from liquefied hydrocarbons, pending bills relative to natural-gas transmission, and how to eliminate CO_2 corrosion in the upper portions of process vessels.

Lube Makers Concerned Over Market Outlook

(Continued from page 79)

under construction show about 30,000 bbl. of daily-charge capacity. These additions to modern process capacity approximate 22 per cent and 25 per cent, respectively, of total charge capacity of the two processes on completion of current construction projects.

The pattern is familiar. The industry has so completely corrected the lubricant-shortage problem that a margin of productive capacity over growing demand now exists and will continue to exist for some time to come. The entire program amounts to a revolution in lube-manufacturing methods, and a stiff competitive situation is under way for the marketing of quality lubricants of all types.

FPC Says It Does Not Intend to Control Oil

(Continued from page 64)

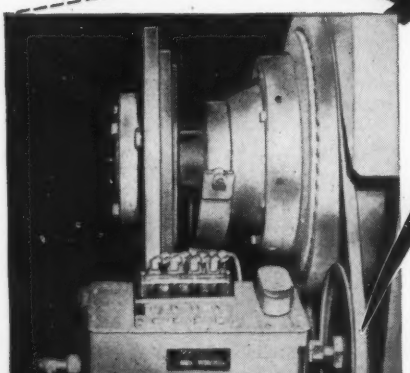
never followed this practice in assigning costs to the jurisdictional and the nonjurisdictional gas business, and it is unreasonable to suggest that it would do so in respect to the nonjurisdictional oil business."

The FPC majority contended there is no necessity for legislation since it feels that no occasion would ever arise to regulate the small producer. On the other hand, it is important that large producers not be permitted, through domination or control of gas production, to establish monopoly prices.

But, the report said, "the commission has no desire to impose its accounting requirements on oil companies or companies which are purely producers or gatherers of natural gas. By a classification of companies, the commission can excuse producers and gatherers from complying with the commission's accounting requirements."

The minority report agreed with the industry's contention that Congress did not intend to assert jurisdiction over independent producers and gatherers, but said that if Congress now thinks they should be under federal control, the FPC "should have the benefit of a clear-cut declaration of such intent, rather than having the entire matter left within its free and complete discretion, with the legislative history of the statute pointing clearly in one direction and certain judicial decisions suggesting the contrary."

TEAMED for Trouble-Free Drilling



Manzel FORCE FEED LUBRICATOR

THIS streamlined, scientifically engineered Rotary Unit is improving efficiency and lowering costs in the oil fields.

Unit Rig and Equipment Co., is one of the many manufacturers who has standardized on Manzel Force Feed Lubricators in order to be *sure* that users of its equipment will receive long, economical, trouble-free service.

Oil companies, drilling contractors, and equipment suppliers all agree that Manzel Lubricators pay for themselves over and over again. Be sure to specify Manzel on your next installation ... and write for helpful information about obtaining Manzels for your present equipment.

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CORROSION RESISTANT

No batteries or other power connections are used for voice transmission or bell. Transient noises are eliminated, leaving the voice clear and distinct. Operation cannot fail due to loss of power. Compact and convenient. Efficient up to 20 miles. Comparable in quality and size to standard telephone sets. Koiled Kord equipped for convenience and long service. See your jobber or write today for booklet SA-8.

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EQUIPMENT MEN . . . in the News

Sun Engineering Appoints Myers General Manager

PAUL M. MYERS

Paul M. Myers has been appointed general sales manager of Sun Engineering Co., Oklahoma City, according to Lloyd Hopeman, president. Myers is well acquainted with the oil-field supply business, having spent most of his time the last 16 years working for various supply companies.

Kirkpatrick to Represent Rotameter in Pittsburgh

Brooks Rotameter Co., Lansdale, Pa., announces the appointment of John G. Kirkpatrick as exclusive representative in the Pittsburgh area, including western Pennsylvania and West Virginia.

Kirkpatrick has been instrument engineer for Koppers Co., Inc., for the past 7 years and is well qualified to advise upon the use of rotameters for flow-rate measuring problems.

Aurora Pump Secures Services of Abramson

E. L. ABRAMSON

Ernest L. Abramson, development engineer with 20 years of experience in the development and design of turbine-type pumps, has associated himself with Aurora Pump Co., of Aurora, Ill. According to Frank S. Main, president of the Aurora firm, Abramson will participate in a broad development program involving new designs, new sizes, and new applications for Aurora centrifugal and Apco turbine-type pumps. Abramson is a 1923 mechanical engineering graduate of Purdue University.

New Deal Specialty Opens Additional Facilities

New Deal Specialty Co., Okmulgee, Okla., manufacturers of pipe-cleaning and pipe-straightening machines, wire-line drilling clamps, drilling spiders, tubing and casing elevators, and tubing slips, has announced the recent expansion of plant facilities to include equipment for installation of Varco buttons in its slips for both casing spiders and elevators.

The plant is also equipped to recondition old-style slips for use with Varco buttons. The buttons are housed in counterbores in the slip body to give even weight distribution. They are movable and easily changed.

Texas Oil Men Buy Matagorda Island

A group of South Texas oil men, equipment manufacturers, and supply men, headed by O. J. McCullough of McCullough Tool Co., recently has acquired a 23-year lease on Matagorda Island for the development of a sportsman's club named Matagorda Club.

The club will be composed of 200 charter members and well over 100 of these have been sold. Matagorda Island, former Army air base off the Texas Coast, is being converted into a year-around hunting and fishing club. The club will open June 1 and will provide recreational facilities for all members of the family.

More than $3,000,000 in facilities and improvements are available on the 7,000-acre peninsula. This includes a $2,000,000 modern airport with more than 4 miles of landing strips and taxiways and accommodations for cubs and multiengined aircraft. Regularly scheduled boat and air ferries will transport nonflyers from Port O'Conner and Palacios to the club.

Club grounds are bounded by two deep-water passes, Greens Bayou Pass on the northeast and Pass Cavallo on the southwest. Though commonly known as a peninsula, the land between these two passes actually forms an island 11 miles long. This entire area will be for the exclusive use of members and their guests.

Copenhaver Joins Kellogg

John W. Copenhaver has joined M. W. Kellogg Co. as head of one of its research groups in the Jersey City petroleum and chemical research laboratory. He was formerly with General Aniline & Film Corp., at Easton, Pa.

Smith and Zane Get Guiberson Promotions

Top management changes in Guiberson Corp. were announced recently by Allen Guiberson, company president. In as executive vice president and general manager to assume direction of all company activities went Alex P. Smith. He was promoted from the position of treasurer which he has held for the past 7 years. The post of general sales manager went to Harry S. Zane, Jr., formerly purchasing manager.

According to Guiberson the appointments came as a result of plans developed for widening the extent of company sales. New products resulting from long-time research are being readied for addition to the list of oil tools now made by the company, he said.

Cloninger Made Louisiana Representative for Foster

Foster Cathead Co. announces the appointment of R. D. Cloninger as field representative, in which capacity he will specialize in service of Foster spinning and breakout catheads. He will headquarter in Lafayette, La., and will warehouse catheads and parts for the Gulf Coast area.

Cloninger has been intimately connected with the drilling business for the past 18 years, having served various operators as roughneck, driller, and tool pusher. Before joining Foster Cathead Co., he was district manager for A-1 Bit & Tool Co., in the Lafayette area.

Kenzel to Manage Republic Cincinnati District Office

Republic Flow Meters Co. announces the appointment of Kenneth K. Kenzel as manager of its Cincinnati district office. Kenzel is an engineering graduate of Northwestern Technological Institute, and has come to Cincinnati after serving as a contract and application engineer with Republic Flow Meters Co., where he has engineered a great variety of applications of Republic's controls, regulators, valves, and instruments.

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All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
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Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

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FOR SALE: 1 Used Braun Portable Distillation Unit, Size G, Ser. #7190, complete with 24'x40'x18' Sectional Steel Building in the Seminole Field. Cities Service Oil Company, Patridge, Bartlesville. Oklahoma.

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Railroad Tank Car Tanks
6,500 to 12,000-Gal. Cap.
Coiled and Non-Coiled
Cleaned—Painted—Tested
Heavier—Safer—Cheaper
Other Tanks Too
Also—Complete Tank Cars
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EQUIPMENT FOR SALE

FOR SALE: Model "K" Cardwell, single drum draw works powered by G.A.K. Waukesha engine. Equipped with 98' "A" mast and sub skid. Priced for quick sale. Terms. Melton Supply Co., Seminole, Okla.

FOR SALE: Complete set of rod and tubing tools for ⅝, ¾ & ⅞ rods and 2" and 2½ regular and upset tubing as well as many other miscellaneous tools. Price $500.00. Electrodrill Corporation, Box 1220, Bartlesvile, Oklahoma. Telephone 774.

SHOT HOLE drill, on 1941 Ford truck. Hyd. lift mast, chain pull down, 3" kelly, 4½ x 6 G.D. pump, twin disc clutches. Waters Drilling Service, 69 Beacon Place, Pasadena 8, Calif.

FOR SALE: 10,000 ft. 20" OD x ¼" Wall New Electric Weld Steel Pipe, Double Random Lengths; 50,000 ft. 18" OD x ¼" Wall Used Steel Pipe, Single Random Lengths. Utility & Industrial Supply Company, 921 Michigan Ave., E., Jackson, Michigan.

1—140 CLEVELAND Ditcher with 22" Buckets, 1 Extra set stripping buckets, 1 TD-9 Side Boom, 1 Cleaning Machine witn spare change over parts and dollies, 1 Pipe finder, 1 Generator, 1 Beveling machine, 1 Power pipe straightener, 1 10-Barrel Heating Kettle, 2 International Trucks and other miscellaneous equipment. McCall & Sebastian, Phone 290, Drumright, Oklahoma.

FOR SALE

NEW CASING AND LINE PIPE

25,000' 5½" 15½# 8RT J55 R2 API Smls. Casing
15,000' 7" 23# 8RT J55 R2 API Smls. Casing
6,000' 8⅝" 28# 8RT J55 R2 API Smls. Casing
4,641' 9⅝" 36# 8RT J55 R2 API Smls. Casing
7,015' 10¾" 40½# 8RT J55 R2 API Smls. Casing
19,000' (893 Joints) 6" Std. Byer's Wrought Iron L.W. Plain End Pipe (ASTM A72-33)

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THE NATIONAL COOPERATIVE REFINERY ASSOCIATION
P.O. Box 770 McPherson, Kansas
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New CENTRIFUGAL PUMP UNITS

For Water, Crude and Petroleum Products

HIGHLY PORTABLE—EXTREMELY FLEXIBLE

PRICED AT LESS THAN HALF OF REGULAR COST

BYRON JACKSON "PUP" 2-stage Multiplex Centrifugal Pump direct connected to **CHRYSLER** Model 36 (Ind. 9) 8-cylinder Gasoline Engine, Mounted on rugged oil field type skid with necessary gauges and controls.

Designed for a wide range of operating conditions, this unit is particularly adapted to "pick-up" service in the oil fields, or other services where large variance in head and capacity are desirable.

Units are guaranteed to be in factory-new condition. Regular production models pump and engine. Parts readily available. Inquire for prices and specifications.

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DEGEN PIPE AND SUPPLY CO.
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FOR SALE: Priced to sell, 1—37,500-bbl. riveted steel Tank with floating Roof, 8—2,000-Gal. gasoline Tanks mounted on Semi-trailers, 10—10x35 gasoline Tank riveted. Write Independent Tank Co., Box 102, Seminole, Okla.

WELL drilling spudders, beams, light rotaries, core drills, tools, casing. Used equipment at money saving prices. Spang and Mills new tools. Leschen lines. Everything for well drilling. Pressey & Son, Pueblo, Colo

ROTARY Drilling Mast 96' steel angle iron. Substructure, raising device, foible board, guy lines, complete. Price $2,500.00. Kiowa Drilling Company, Inc., 717 Union National Bank Building, Wichita 2, Kansas. Phone 3-8013.

NEW CENTRIFUGAL PUMPS

Byron Jackson—Aurora—Lombard—Gould—Hale—Gorman Rupp—Wayne & Novo, complete with engine power, also 1½ to 20 KW light plants. H. A. McCarthy, 310 Thompson Building, Tulsa, Oklahoma.

FOR SALE: Mush Creek area, New Castle, Wyoming: One new 36 L Bucyrus Erie cable tool rig and one used 36 L Bucyrus Erie cable tool rig. Capitol Oil and Gas Corp., 414 Majestic Bldg., Cheyenne, Wyoming, or Jack Bradley, Phone 179-W, New Castle, Wyoming.

FOR SALE: Star 45C Heavy Duty Spudder powered by D 13,000 skid mounted Caterpillar diesel, steel A mast, and all necessary 13 inch, 10 inch, and 8 inch long joint seamless big hole pipe with or without tools and wire line. P.O. Box 149, Eureka, Kansas.

SAVE WITH SAFETY—Very Good Used Wire Line—Any Size or Length up to 5,000'—Respooled for Your Inspection—Cable Tools for Sale. General Tool & Supply Co., P.O. Box 4387, Phone 61335, Oklahoma City, Okla.

FOR SALE: 75,000' 10" 28 lb., 225,000' 10" 31 lb., 95,000' 12¾" 34 lb., 60,000' 16" 42 lb. plain end line. Inquire: Rogers Pipe & Supply Co., 221 Wright Bldg., Phone 3-2072, 5-8850, Tulsa, Oklahoma.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
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NEW EQUIPMENT FOR SALE

3—75 HP Westinghouse Electric Motors, Frame 752-C, 60 Cycle, 440 Volt, Style 4N-1987, Splash proof @ $1,474.00 each F.O.B. Douglass, Kansas.

6—50 KVA Westinghouse Transformers, Style 1191828, 7200/12470Y Voltage @ $589.00 each F.O.B. Douglass, Kansas.

Write or call

MORRISON PRODUCING COMPANY
Drawer 712, El Dorado, Kansas, Phone 314

FOR SALE

6—24' x 20' steel storage tanks, 68,000 gallons capacity, ½" 1st ring 7/16" 2nd ring, ⅜" 3rd ring, ⅜" roof, riveted construction.
1—34' 6" x 35' steel storage tank, 250,000 gallons capacity, ⅜" plate except top ring and roof which are ¼", welded construction.
5—8' x 32' steel storage tanks, 12,000 gallons capacity, ¼" plate, flanged flat heads, welded construction.
11—10' 6" x 40' 6" steel storage tanks, 25,000 gallons capacity, ⅜" shell, 7/16" flanged and dished heads, welded construction.

ROGERS AND WRIGHT, INC.
710 Peoples Building
Charleston, West Virginia
(Phone 30-171)

EQUIPMENT FOR SALE

NEW SMLS A.P.I. J55 L.T. & C 8.RT.R2 150,000 Ft. 5½" O.D. 15½#, $1.27; 125,000 Ft. 5½" O.D. 17#, $1.35; 115,000 Ft. 5½" O.D. 20#, $1.55; 175,000 Ft. 7" O.D. 23#, $1.93; 125,000 Ft. 8⅝" O.D. 32#, $2.36; 140,000 Ft. 10¾" O.D. 40.5#, $3.35; 150,000 Ft. 2⅜" O.D. 4.07# external upset tubing. 59c.
ELECTRIC WELD—R2 LINE PIPE PLAIN ENDS BEVELED FOR FIELD WELDING 300 miles 12¾" O.D. 33.38#, $2.35; 250 miles 8⅝" O.D. 26.67#, $1.92; 425 miles 4½" O.D. 10.79#, 73c; 300 miles 3½" O.D. 7.57#, 60c. Box C-879, The Oil and Gas Journal, Tulsa, Oklahoma.

1—140 CLEVELAND Ditcher with Hydraulic digging wheel lift and steering clutches. Hercules gas engine. In good condition, price reasonable. Nichols Construction Co., Box 376, Great Bend, Kansas. Phone 5772.

TANKS—TANK CARS
NEW LOW PRICES
2—74,000 Bbl. Steel Tanks, Like New
6—25,000 Gal. New Horizontal Welded Tanks
80—8,000 & 10,000 Gal. Cap. Tank Cars
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60 E. 42nd St., N.Y. 17, N.Y.

FOR SALE

⅞" Sucker Rods, Jones 7. New price 60c per foot, 3—7,000 ft. strings from Oklahoma City field. Located at Oklahoma City—20c per foot.

M. R. TRAVIS
Phone 2-2447 **P. O. Box 1343**
Tulsa, Oklahoma

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts.

OKLAHOMA MACHINE & SUPPLY CO.
Ada, Oklahoma

Several Army Surplus 4½" x 6" Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN: W. H. Orr
Phones: 132—Rockdale, Texas
A-86064—Houston, Texas

NEW MATERIAL FOR SALE AT LIBERAL DISCOUNT

1—36" ID x 46' Oil Still, 150# WP at 625° F., 225# Test Pressure, 20 Glitsch Truss Type Bubble Trays.
1—20" OD x 15' Oil Dehydrator, 230# WP at 500° F., 345# Test Pressure.
1—36" OD x 6' Still Reflux Tank, 139# WP at 100° F., 208# Test Pressure.
2—17-16-664 EFCO Type CFR Floating Head, Removable Tube Bundle, Shell & Tube Exchangers. Surface: 664 sq. ft. ea. Tubes: 211 ¾" OD #16 BWG x-16' Long Inhibited Admiralty Tubes.

	Shell	Tubes
Working Pressure	150#	75#
Working Temp.	200°	200°
No. of Passes	4	2

1—Brown Model 156 x 63 P36 Multipoint Precision Indicator. Range: 75° to 575° F. I.C. Calibration for 115 Volts, 60 Cycle A.C. Current. 36—12" 20 ga. I.C. Thermocouples w/approx. 3000' CW2-16 Waterproof Lead Wire.
1—Beaird Model 3 Indirect Fired High Pressure Gas Heater Modified to Vaporize Dowtherm "A" in Lower Section & Condense in Upper Section. Slightly Used.
1—1½" Type 86-D-50 Climax Motor Valve. 500# SG C.I. w/1½" DP 18-8 IV.
1—2" Type 86D Climax Motor Valve. 250# SG 18-8 2" DP Para.
2—8" Type 91 Climax Liquid Level Controllers. 150# at 450° F.
Also Various Sizes Gate Valves and Welded Fittings.

GREGG-TEX GASOLINE CORP.
P.O. BOX 1912, LONGVIEW, TEXAS

EQUIPMENT FOR SALE

FOR SALE: New Buda PCD1879 Diesel Engine. Engine complete with radiator but less flywheel housing. A real buy at $5,800. Also, one new 140 HKU Waukesha multi-fuel engine with all Hesselman parts included. Price $1,200. Box C-873, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: One Sullivan Core Drill equipped for water well drilling. Paul Hardy, 800 Camino de las Marquez, Santa Fe, New Mexico, Phone 3368-J.

FOR SALE: Wilson Giant draw works, powered by 2—J.L.-1335 Buda engines and Wilson chain compound. Like new condition, with bargain price. Terms. Melton Supply Co., Seminole. Okla.

PACKAGED H_2S REMOVAL UNITS

We offer prompt shipment on skid-mounted hydrogen sulfide removal units for treating sour gas for pipe line or fuel gas purposes.

GRAFF ENGINEERING & EQ'PT. CO.
3415 Westminster, Dallas 5, Texas

PARTS FOR ARMY TRUCKS

New and Used

Largest stock in America, 6x8, 6x4, 4x4, 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. New jeep power units complete with radiators and stub shafts. Fast service.

PIONEER AUTO WRECKING CO.
732 W. 13th Ave. **Denver 17, Colo.**

EQUIPMENT WANTED

WANTED: New or used Magnetometer. Please send price, make and model. Phil Koeber, 2415 Exposition Blvd., Austin, Tex.

EQUIPMENT WANTED

WANTED: Oil field salvage and scrap; abandoned leases, strippers; used tubular products, dead lines. Industrial plant and lease dismantling a specialty, full coverage. HIGHEST PRICES PAID. ROZEN IRON & METAL CO., MAUD, OKLAHOMA. Write P.O. Box 686. Phone 330.

WANTED: Three 100 HP engines and compressors, Superior preferred. Keystone Pipe & Supply Co., 902 Burk Burnett Bldg., Fort Worth, Texas.

HELP WANTED

ENGINEERS, Executives, Technical Men: Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection, will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

WANTED: Land Man thoroughly experienced, by well-known independent oil company. Liberal salary with opportunity for rapid advancement. Give record of experience. Answers held confidential. Box C-882, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERING

During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.
2300 Chester Ave., Cleveland 1, Ohio

HELP WANTED

PRODUCTION EXECUTIVE WANTED

Large independent company operating principally on the Texas Gulf Coast. Applicant should have thorough experience in Gulf Coast drilling and production problems, including high pressure reservoir completions of both oil and gas, dual completions, injection wells and should be equipped to prepare and maintain adequate reservoir engineering studies, including utilization of casinghead gas and pressure maintenance. This is a permanent, responsible position and will require a high type of executive. Salary and other remuneration commensurate with background and experience. Man selected will be thoroughly investigated but investigation will be confidential. Reply giving full details as to age, education, training, and salary desired. Our own employees have been advised of this advertisement.

Address Box C-867, The Oil and Gas Journal, Tulsa, Oklahoma.

OUTSTANDING POSITION OPEN

Engineer to direct Sales of Refinery process units. Qualifications to include sales and process engineering experience with major oil companies or petroleum engineering and contracting firms. Knowledge of oil refining process engineering plus economic evaluations and applications necessary. Age 35 to 45 years. Excellent compensation—salary and bonus. Location—New York or Tulsa. When replying state educational and experience background. Our own employees notified of opening.

Address: Box Number C-860, The Oil and Gas Journal, Tulsa, Oklahoma

HELP WANTED

MANUFACTURER of oil field drilling equipment wants representatives in Wyoming, Colorado, California, and Illinois areas. Write Box C-875, The Oil and Gas Journal, Tulsa, Oklahoma, giving complete information including present lines.

SALES ENGINEERS to sell emulsion treaters, heaters, water knock-outs, etc. Protected territory in Mid-Continent area. Your identity and present position protected. Write qualifications for appointment F. L. Murdock, Murdock Tank & Mfg. Co., P.O. Box 327, Tulsa 7, Oklahoma.

CORROSION ENGINEERS

Graduate Engineers, under 30, two or more years' experience in survey and installation work on pipe lines. Sohio Pipe Line Company, P. O. Drawer D-15, St. Louis, Missouri.

PETROLEUM Engineer. By independent producing company. Should have experience Panhandle Area, North Texas, or Oklahoma. Write fully record of experience and salary desired. Excellent opportunity, Box C-883, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—REFINERY CHEMIST

Must have degree in Chemistry or Chemical Engineering. Give **detailed** information on laboratory experience. Also personal information and salary expected in first letter. Write Box C-869, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST

For home office of expanding production corporation. Must have administrative ability, business experience and capable of analyzing and recommending lease and drilling deals and crude producing property acquisitions. Familiarity with geology of the southwest, particularly West Texas area, desirable. Fine opportunity for proper party. Give full facts. Replies confidential. Our own people know of this opening. Box C-876, The Oil and Gas Journal, Tulsa, Okla.

WANTED
JUNIOR APPRAISAL ENGINEER

To assist Insurance Department of independent oil company set up equipment records and establish insurable values for oil production, refining, transportation and marketing properties. Applicants should have an engineering degree and at least one year's practical appraisal experience. Location — Middle West. Limited amount of traveling required. Good opportunity for continuous work and advancement.

Box C-891, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

ACCOUNTANT: 15 years experience, including 4 years public accounting, and 6 years crude oil operations and production. Familiar with all phases of accounting pertaining to leasing of acreage, drilling of wells, operating of leases, production and sale of crude oil. Desire to contact oil operator and producer who may be in need of such services. Previous employer sold out and retired. Good references can be furnished. Write: Box C-864, The Oil and Gas Journal, Tulsa, Oklahoma.

YOUNG EXECUTIVE ENGINEER, age 35, congenial, ambitious, energetic, M.S. in Ch.E., Texas registered professional engineer. Varied experience including chemist, research engineer, design and construction engineer, plant superintendent of large and small plants, independent pipeline contractor. Desires high type sales or administrative position. Position should be such as to yield a great deal of personal satisfaction as well as considerably above average income. Now located East Texas, Gulf Coast or Mid-Continent area preferred. Available immediately. Box C-896, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

CONTROLLER-TREASURER

Experience with independent oil company in production, refining, marketing accounting, taxes and finance; presently employed; desire change. Box C-885, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED GAS ENGINEER--Desires to become associated with L.P. Gas Dept. of Oil Company. Five yrs. plant operation experience with propane, water, & coal gas; together with two years distribution experience. Licensed Professional Engineer, Single, 36, Veteran. Box C-889, The Oil and Gas Journal, Tulsa, Oklahoma.

COMPETENT PETROLEUM GEOLOGIST with years of experience in: Geology, Geophysics, oil and gas production, land and title work, obtaining easements, valuation work, and General Business Management wants responsible position with independent oil producer or small oil company. Personal data: 40 years old, married, perfect health, no physical defects, 6 years Latin American experience, degrees in Geology from Univ. of Tex. and Univ. of Calif. Registered Professional Engineer for Texas. GEOLOGIST, 504 N. Fannin Ave., Cameron, Texas.

COLLEGE GRADUATE: 15 years' field experience. Supervision of rotary and cable tool drilling, well completions, and producing operations. Several years scouting, leasing and title curative work. Age 36. Desire permanent connection having sound future. Box C-888, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: 16 years' experience in the Mid-Continent and Gulf areas. Thoroughly capable of assuming complete charge of the drilling, completion and production of oil. Considerable experience in division offices in managerial capacity. Have also a degree in Geology. Box C-887, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEERING graduate, 3½ years experience in drilling, production and pipe lining, one in sales service. Available immediately for domestic or foreign employment. Box C-895, The Oil and Gas Journal, Tulsa, Oklahoma.

PROCESS ENGINEER: B.S. Chemical Engineering. Experienced in process engineering and plant operations. Extensive Fluid Catalytic Cracking experience. Well versed in yields and refinery balances. Desire permanent position in process engineering or operations. Midwest or southwest location preferred. Presently employed. Box C-894, The Oil and Gas Journal, Tulsa, Oklahoma.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908 Oil-Gas (all states), Business, Real Estate Legal Forms, Leases, Revised With Government Regulations, Commercial Printing, Catalog and Samples on request. Burkhart Printing & Stationery Company. 115 South Cincinnati. Tulsa 3, Oklahoma

SERVICES

RADAR Surveys: Latest mobile radar equipment installed in Jeep and modified for oil exploration. Locates and outlines areas of possible oil saturation. Defines faults. For further information write Geotronic Laboratories, 421 S. Locust St., Centralia, Illinois.

PECOS DRILLING COMPANY, INC.
DRILLING CONTRACTORS "Cable Tools"
302 CARPER BUILDING, TELEPHONE 840
ARTESIA, NEW MEXICO

WANTED: MACHINE—WELDING—
SMALL TANK CONTRACT WORK

We have the equipment and personnel to handle your job. Shipping facilities with good connections to all states. Qualified ASTM welders. All work guaranteed and the price will be right.

Hominy Welding & Machine Works
Box 754, Hominy, Okla.

PHIPPS & ASSOCIATES
Engineers — Surveyors
209 Barnett Madden Bldg.
JACKSON, MISS.

PIPELINE & POLELINE
SURVEYING — MAPPING

ROYALTIES

DEEDED ROYALTIES

San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

ROYALTIES IN HOT AREAS!

Recent strikes have focused attention on Montana's deeper oil zones and major companies are moving fast, drilling and leasing. We buy direct in the field, sell direct to our customers. Write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

LEASE AND DRILLING BLOCKS

WILL BUY producing gas properties or oil production 20 bbls. up. Leases with space for additional development preferred. Any state. Box C-893, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Oil and Gas Leases and drilling propositions in shallow territory of Allen, Simpson, and Warren Counties, Kentucky. W. P. Harley, Bowling Green, Ky.

3434 ACRES oil lease on Meridian Anticline S.W. Wyoming, $1.00 per acre. R. O. Barnsley, 950 Lincoln Ave., Palo Alto, Calif.

ALBERTA SETUP

Can get Reservation to 100,000 acres or Crown leases in smaller Blocks. Can get freehold or script. A heavy and light steam rig. A Dominion charter if desired. Driller, Box 4039, South Edmonton, Alberta, Canada.

WILCOX, ARIZONA

Large Scale Oil Developments under way; Oil Leases in and around Wilcox at ground floor prices. Now is time to buy; Address Guy J. Stumpff Co., Wilcox, Ariz.

OIL LEASES for sale in large, small or medium size blocks in Colorado, Wyoming, New Mexico, Montana, Arizona. Wholesale or retail. Write for descriptive list. Dyer-OJ, 1835 Champa, Denver, Colorado.

OPERATORS AND LEASE BUYERS

Cable tool well starting to make oil test of 600′ & 1100′ sands. Up dip wells showed evidence for production in both sands in rotary wells against strong water drive in down structure wells. Offer along line of strike 40a ½ mile, 80a 1 mile & 120a within 1½ mile of well at $12. to $8.p.a. Location SW Roosevelt County, New Mexico. Subsurface maps & report furnished interested parties. Box C-892, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois

Inquiries Invited

B. D. BUCKLEY

60 Broadview Drive, Clayton (5), St. Louis, Missouri

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

RANCHES AND FARM LANDS

1,000-ACRE RANCH

16 miles of Colo. Springs, with wonderful mountain view. Fine 4 bedroom house in excellent condition inside and out, fine sheds, corrals, other buildings. Good water at 6 to 14 feet, with excellent spring in pasture. Most all could be farmed. Some alfalfa. A wonderful home for a discriminating buyer. About $20,000 improvement. The price is $40,000, with terms. For full information write Guy Speakman, 21 S. Nevada, Colo. Springs, Colo., % Wood & Waters.

BUILDING SPACE

LEASE OR SALE: Two story brick building; offices, light manufacturing, or warehouse—9,000 sq. ft., 2,750 sq. ft. now leased. Close to business district, Tulsa. Available now. Owner: Bud Woods, 305 Pythian Building, Tulsa, Oklahoma.

FOR RENT
HOUSTON, TEXAS

Offices 1-2 and 3 room suites, also 1200 sq. feet store space street level. Air conditioned, Heated, Parking Facilities. East End. Ideal for Oil Field Supply or Trucking Firms.

AUTO EQUIPMENT & SUPPLY CO.
1900 Austin Street, Houston, Texas

SALES REPRESENTATIVE

SALES REPRESENTATIVE well established in Tulsa, desires an additional well-known marketing or engineering account for the State of Oklahoma. Box C-886, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES REPRESENTATION

Warehouse Facilities, Beaumont, Texas
Reliable representation, 25 years successful experience. Sales to Refineries, Pipe Lines, Chemical Plants. Excellent Warehouse with spur track. Handle equipment or supplies on distributor or consigned basis. Box C-890, The Oil and Gas Journal, Tulsa, Oklahoma.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D.C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D.C., on or before 1 p.m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required under 43 CFR 192.42 (b) and (c). The envelopes should be plainly marked that they are not to be opened before date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U.S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of 25c per acre so long as the land is valuable only for gas; but upon discovery of a valuable deposit of oil within the boundaries of the known geologic structure on which all or a part of these lands are situated, annual rental will be at the rate of $1.00 per acre. The lands are in the known geologic structure of the Hugoton gas field, 6th P.M., Kansas, and are offered in the following parcels: Parcel No. 1, T. 26 S., R. 33 W., Sec. 5, SW¼NE¼, SE¼NW¼, 80 acres. Parcel No. 2, T. 25 S., R. 37 W., Sec. 30, S½NE¼, E½SW¼, SE¼, 320 acres. Parcel No. 3, T. 25 S., R. 38 W., Sec. 14, S½, 320 acres, and Parcel No. 4, T. 25 S., R. 38 W., Sec. 26, S½, 320 acres. Total 1040 acres. Bids must be submitted on or before 1 P.M., May 11, 1949, and must be submitted on each parcel separately, but no objection will be made to the award of more than one parcel to the same successful bidder. Marion Clawson, Director.

Permian Basin

(Continued from page 178)

lurian 12,385 ft., Ellenburger 13,060 ft., elev. 2,832 ft.

Runnels County: Florence Drilling Co. 1 E. W. Gray, NE NE NE Subd. 40, Day Land & Cattle Sur. 26, 4 mi. NW Benoit, pumped 142 bbl. 35°-gravity oil a day, sand 2,369-96 ft., TD, shut-in pressure 1,200 psi., elev. 1,762 ft.

Homer Easterwood 2 H. Giesecke, SW SW SW Blk. 121, J. Hughes Sur. 227, 15 mi. Se Ballinger, pumped 54 bbl. 35°-gravity oil a day, pay 1,780-92 ft., TD 1,954 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURE

Pecos County: Helmerich & Payne, Inc., 1-E Lowery & Wilson, Sec. 15, Blk. 2, TCRR Sur., 12 mi. W Iraan, 2 mi. W Yates field, dry, TD 1,570 ft.

SOUTHEASTERN NEW MEXICO

HOBBS. — Amerada Petroleum Corp. 1-BTA State, NW SE 2-12s-33e, which had discovery production in the Pennsylvanian at 8,992-9,172 ft., has added a new producing horizon, tentatively identified as the Devonian, topped at 10,750 ft. A 5-hour drill-stem test from 10,794-10,810 ft., using 2,300 ft. of water blanket and 1-in. bottom and ⅝-in. top chokes, flowed the water blanket in 22 minutes, and oil to tanks in 45 minutes. Hourly gages of the 46°-gravity oil were: 71.8, 76.6, 73.2, and 41.4 bbl. during the last 20 minutes of the test. Flowing pressure was 225 psi. It was coming out of the hole at last report.

Amerada 1 Caudle, 1 mile southwest of the 1-BTA, in 10-12s-33e, was drill-stem testing at 4,475 ft. Same operators' 1-BTB, 26-12s-33e, was drilling below 4,275 ft.

Amerada 1 J. R. Hamilton, NE SW 35-16s-38e, Devonian discovery, 5 miles southwest of Devonian production in Jones Ranch field of Gaines County, Texas, was drilling below 12,552 ft. after recovering oil on two drill-stem tests. After running casing to 12,518 ft., and drilling plug, a test of open hole from 12,518-28 ft. recovered the water blanket, 1,943 ft. of mud cut with oil, and 4,087 ft. of 43.7°-gravity oil. A 4-hour test from 12,528-552 ft. recovered the water blanket, plus 5,180 ft. of oil in the tubing and 2,500 ft. of mud cut with oil and gas.

Phillips Petroleum Co. 1 Shipp, Ellenburger test in 20-18s-37e, recovered drilling mud with no shows on a 1-hour drill-stem test from 12,310-435 ft. It prepared to test to 12,490 ft. Top on the McKee section was 12,295 ft.

Stanolind Oil & Gas Co. 1 South Mattix Unit, SW NE 15-24s-37e, Ellenburger discovery on the north side of shallow Langlie-Mattix field, was running casing for open-hole production tests.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Lea County: Kewanee Oil & Gas Co. 36 Baish, Maljamar field deep test, NW NW 28-17s-32e, dry, TD 10,747 ft., PB 6,900 ft., Glorietta 5,420 ft., Abo 7,545 ft., Wolfcamp 9,165 ft., Pennsylvanian 10,125 ft., elev. 3,994 ft.

TEXAS PANHANDLE (DISTRICT 10) SUCCESSFUL WILDCAT

Roberts County: Sinclair Prairie Oil Co. 1 C. S. Lips, 135-C-G&M Survey, on potential flowed 420 bbl. 35°-gravity oil a day, Mississippian 8,900-70 ft., TD 9,557 ft., PB 8,990 ft., GOR 1,595 cu. ft., CP 895 psi., TP 150 psi.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D.C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., on or before 1 p.m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required under 43 CFR 192.42 (b) and (c). The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U.S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1.00 per acre. The lands are in the known geologic structure of the Kevin-Sunburst Field, P.M., Montana, and are offered in the following parcels: Parcel No. 1, T. 35 N., R. 3 W., Sec. 4, lots 1, 2, S½N½, 238.58 acres. Parcel No. 2, T. 35 N., R. 2 W., Sec. 19, SE¼SW¼, 40 acres. Parcel No. 3, T. 34 N., R. 2 W., Sec. 3, lot 4, SW¼NW¼, NW¼SW¼, 120.12 acres. Total 398.70 acres. Bids must be submitted on or before 1 P.M. May 11, 1949, and must be submitted on each parcel separately, but no objection will be made to the award of more than one parcel to the same successful bidder. Marion Clawson, Director.

CALENDAR OF EVENTS

May

American Society of Mechanical Engineers, spring meeting, Mohican Hotel, New London, Conn., May 2-4.

Independent Petroleum Association of America, midyear meeting, Roosevelt Hotel, New Orleans, La., May 2-3.

American Petroleum Institute, division of marketing, midyear meeting, Jefferson Hotel, St. Louis, May 9-10.

American Gas Association, natural-gas department, spring meeting, French Lick Springs Hotel, French Lick, Ind., May 9-10.

Interstate Oil Compact Commission, spring quarterly meeting, Roosevelt Hotel, Jacksonville, Fla., May 9-11.

American Institute of Chemical Engineers, regional meeting, Mayo Hotel, Tulsa, May 9-11.

Liquefied Petroleum Gas Association, annual convention, Palmer House, Chicago, May 9-11.

American Petroleum Institute, division of production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles, Calif., May 12-13.

Instrument Society of America, annual spring meeting, Royal York Hotel, Toronto, Canada, May 12-13.

Oil-Heat Institute of America, national oil heat exposition and annual convention, Boston, Mass., May 16-20.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 23-25.

American Association of Oilwell Drilling Contractors' fourth annual drilling industry safety clinic, May 24-25, Baker Hotel, Dallas.

Society of Automotive Engineers, diesel engines, Engineering Societies Building, New York, May 26.

American Petroleum Institute, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., May 26-27.

Natural Gas and Petroleum Association

of Canada, annual meeting, Hotel London London, Ont., Canada, May 26-27.

Fourth Annual Short Course in Gas Technology, sponsored by Southern Gas Association, Texas A. & I. College, Kingsville, May 30-June 1.

June

Petroleum Equipment Supplier's Association, annual meeting Broadmoor Hotel Colorado Springs, Colo., June 5-7.

National Oil Scouts and Land Men's Association, annual meeting, Shamrock Hotel, Houston, June 9-11.

Canadian Gas Association, annual convention, Bigwin Inn, Lake of Bays, Ont., Canada, June 16-20.

American Society for Testing Materials fifty-second annual meeting, Hotel Chalfonte Haddon Hall, Atlantic City, N. J., June 17-July 1.

Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh, Pa., June 16-17.

Kentucky Oil & Gas Association, annual meeting, Hotel Lafayette, Hotel Phoenix, Lexington, Ky., June 23-24.

American Society of Mechanical Engineers, semiannual meeting, University of California Extension Building, San Francisco, June 27-30.

August

United Nations Scientific Conference on the Conservation and Utilization of Resources, U. N. Interim Headquarters, Lake Success, N. Y., August 17-September 6.

September

Instrument Society of America, annual meeting and exhibit, Municipal Auditorium, St. Louis, September 12-16.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 14-16.

American Gas Association, annual convention, Chicago, September 17-20.

American Institute of Chemical Engineers, Mt. Royal Hotel, Montreal, September 18-20.

American Association of Oilwell Drilling Contractors, ninth annual meeting, Baker Hotel, Dallas, September 19-21.

National Butane-Propane Association, Jefferson Hotel, St. Louis, September 19-21.

American Society of Mechanical Engineers, fall meeting, Erie, Pa., September 28-30.

October

American Society of Mechanical Engineers, petroleum division, 1949 Petroleum Mechanical Engineering Conference, Biltmore Hotel, Oklahoma City, October 2-5.

National Lubrication Grease Institute, Hotel Roosevelt, New Orleans, La., October 3-5.

Texas Mid-Continent Oil and Gas Association, annual meeting, Rice Hotel, Houston, October 13-14.

American Gas Association, annual convention, Chicago, October 17-20.

Independent Natural Gas Association of America, annual meeting, Baker Hotel, Dallas, October 31.

November

American Petroleum Institute, annual meeting, Stevens Hotel, Chicago, November 7-10.

American Society of Mechanical Engineers, annual meeting, Hotel Statler, New York, November 27-December 2.

December

American Institute of Chemical Engineers, annual meeting, William Penn Hotel, Pittsburgh, Pa., December 4-7.

NOMADS

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

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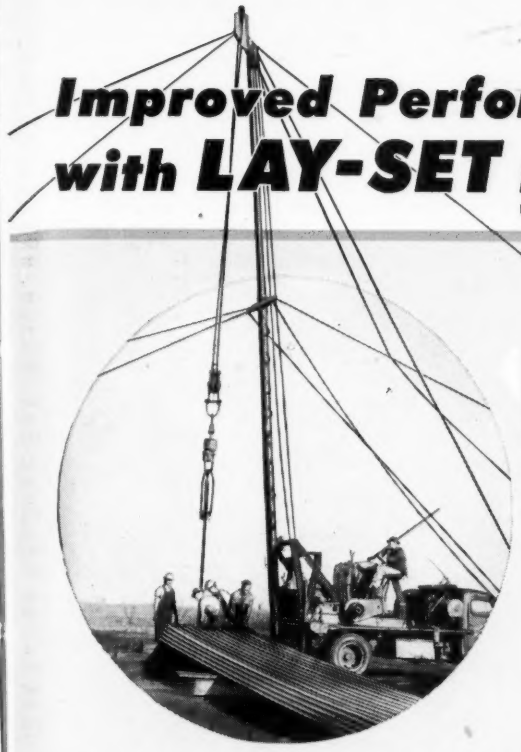
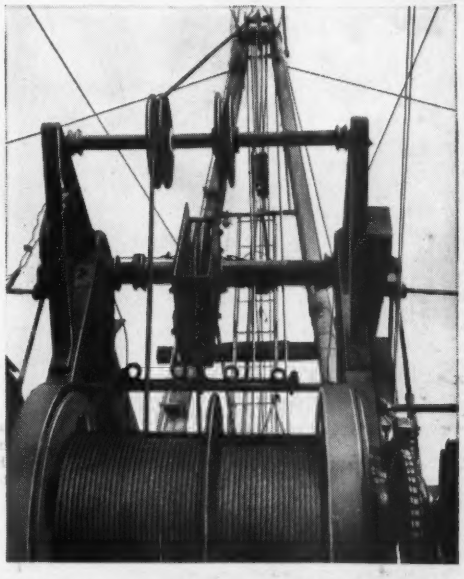


There's a wire line that resists the whipping of sucker rod and tubing lines running at high speeds. It's LAY-SET Preformed. And how it stands up under shock loads when it is stopped suddenly! Yes, LAY-SET has been the favorite for years because it offers *improved performance.*



Cable tool drilling lines are jerked, whipped and snapped. Clean-out lines run at high speeds and rub against the casing much of the way down or up. These lines must be designed for the job or they won't last long. HAZARD has cable tool lines that are engineered for longer life. They cost less to use.

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HAZARD'S two great oil field ropes are LAY-SET Preformed and NONPARELL non-preformed. Each is designed to give improved performance on certain jobs. Each has many years of engineering and field experience built into its design. You will improve the performance of your equipment by insisting on HAZARD oil field ropes.

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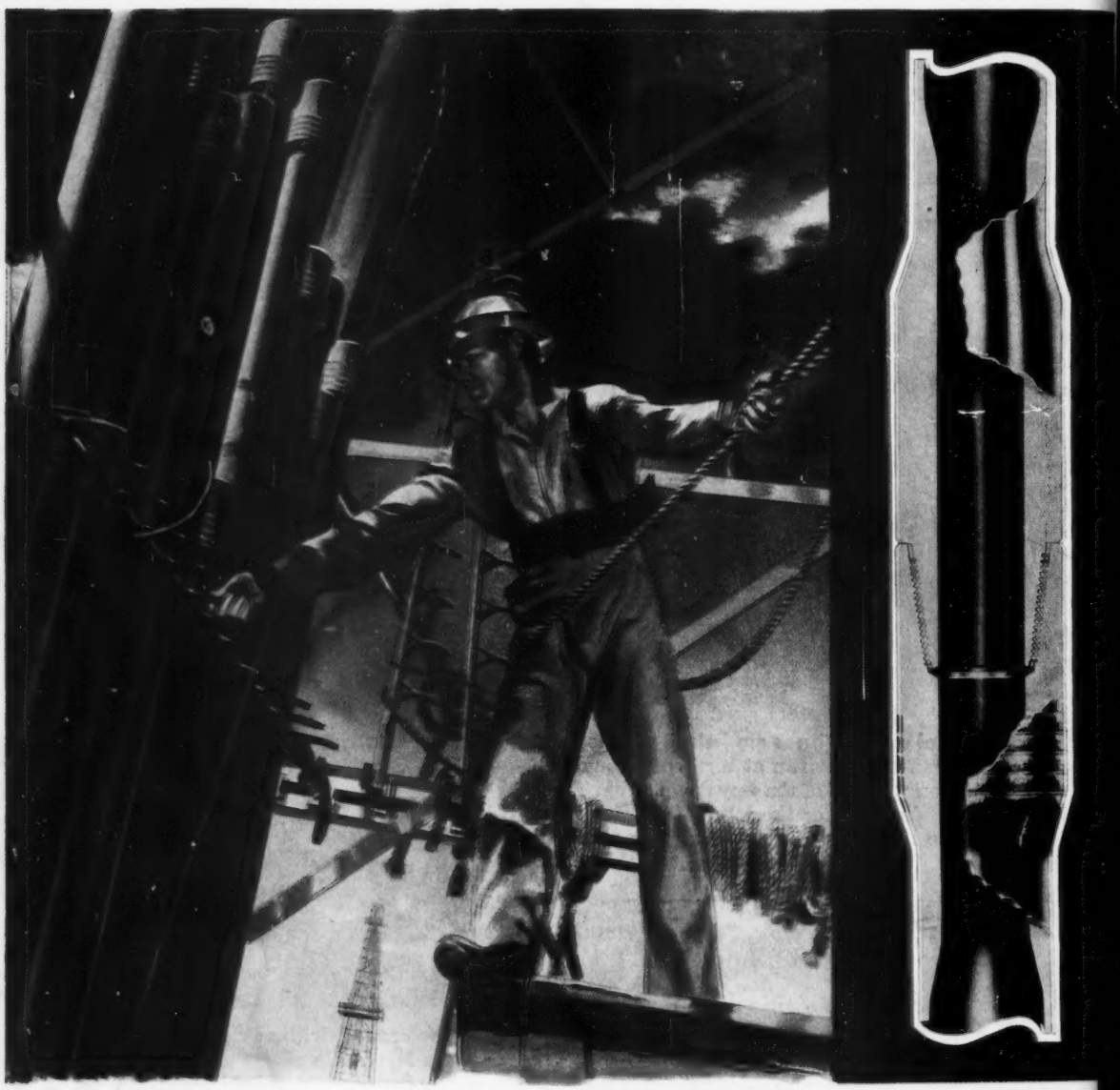

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